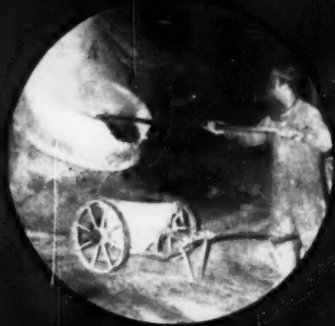
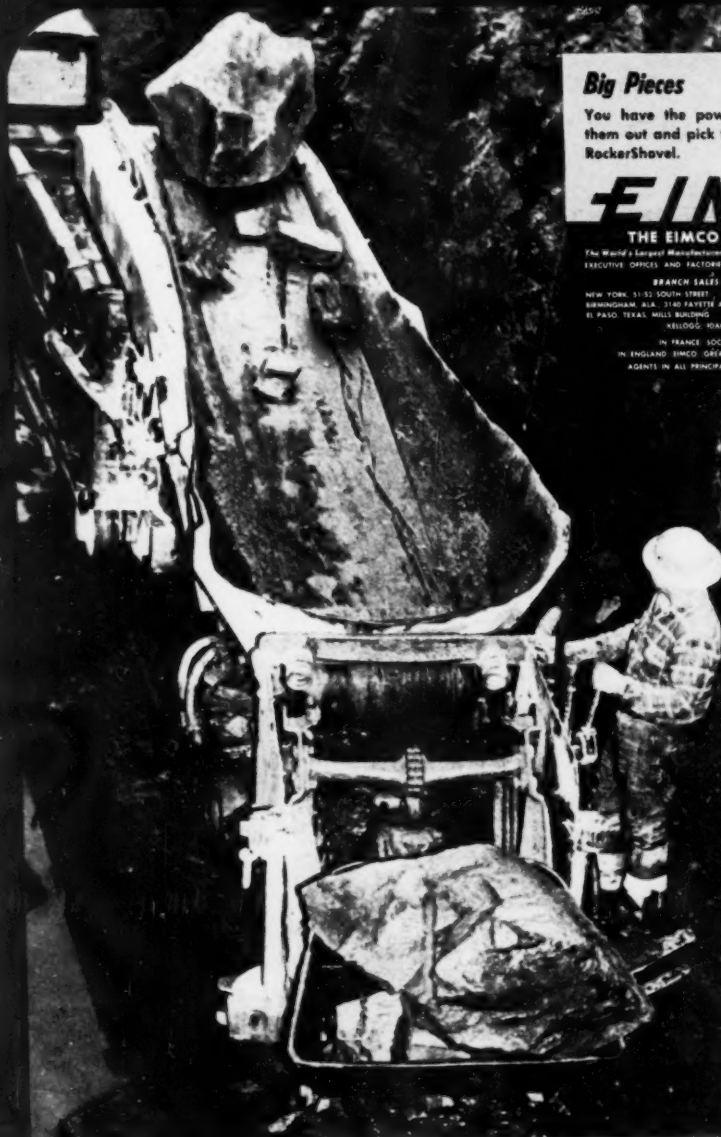


MINING WORLD



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problems



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WRITE FOR BULLETIN MCL.

1859

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IN COMPRESSORS, PUMPS AND ROCK DRILLS

Norblo

Yellow Pine Antimony Smelter, Stibnite, Idaho, producers of Elk Brand Antimony Oxide.

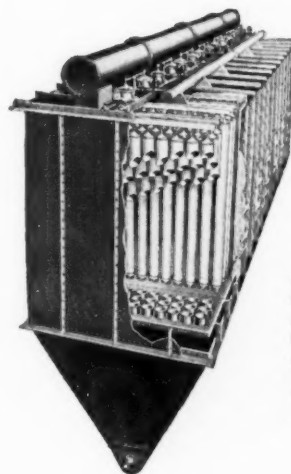


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Ninety per cent of the antimony mined in the United States is with Norblo Automatic Bag Type Dust-and-Fume Collectors, at the smelters shown above. Here seven separate Norblo bag houses are used in the roasting, smelting, refining or conversion of antimony, gold and tungsten.

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Cutaway shows Norblo basic unit of 78 bags. Automatic shaking and bag cleaning, one unit at a time, insures full use of cloth area better than 99% of the time.

Write for Bulletin 164-2

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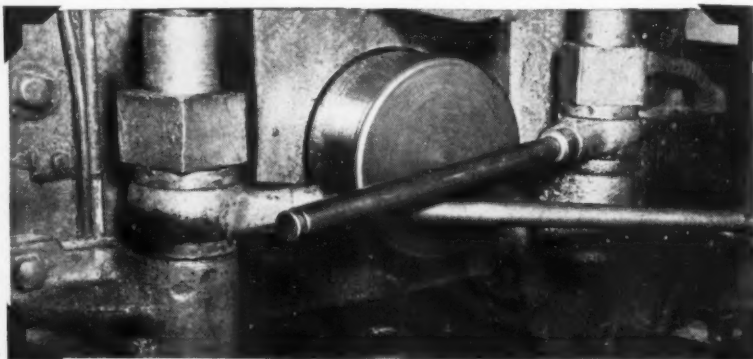
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STANDARD ENGINEER'S REPORT

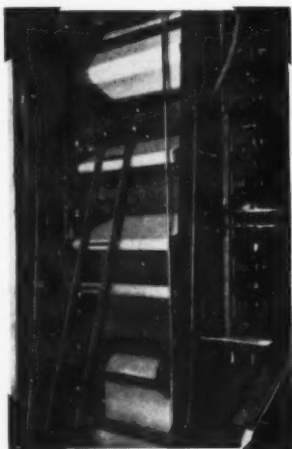
DATA	
LUBRICANT	Calol Red Engine Oil
UNIT	Industrial bearings
LUBRICATOR	Circulating + drip-feed
CONDITIONS	High ambient temperatures & moisture
FIRM	Oregon Pulp and Paper Co., Salem, Oregon

Bearings in service 15 years in hot, moist conditions!



PLAIN BEARINGS, operating at 300 rpm in temperatures up to 175°F. (see calendar bearing above), and with water for cooling often applied directly (see photo at left), have been in service 15 years in the Salem mill of Oregon Pulp and Paper Co. They were lubricated with Calol Red Engine Oil-11 during the entire time.

CALOL RED ENGINE OILS are used throughout this mill, even on the bearings of "glassine paper" calendars (right), which bear tremendous loads. The ability of these specially refined, stable mineral oils to provide adequate lubricant in tough conditions will reduce wear and save maintenance costs in your mill or other industrial operation. They come in several grades to meet varying conditions and requirements.

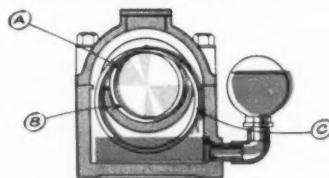


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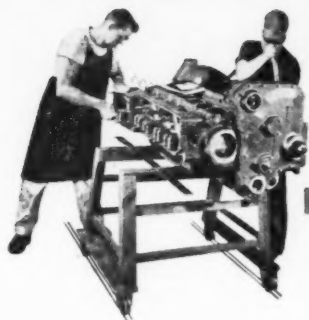
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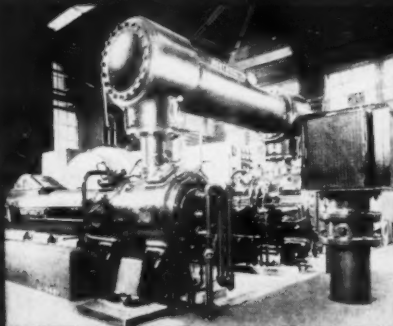
Stoppers . . . Operating Handle well above center of gravity for easy handling. Positive, sleeve-type valve—minimum wear.



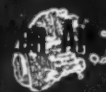
Clay diggers . . . Built-in ease of handling helps operators get more work done with less fatigue.



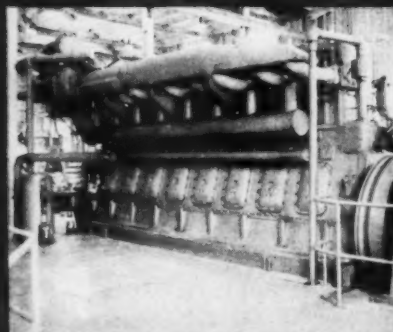
Breakers . . . Hard-hitting tools with soft rubber grip handles for dampening vibration.



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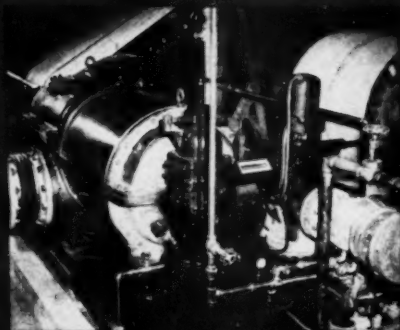
No other compressor will outperform a Worthington. All sizes—mechanical, V-type, belt and gas engine driven—available in capacities from 125 to 1250 hp for 2000 to 20000 psi.



W

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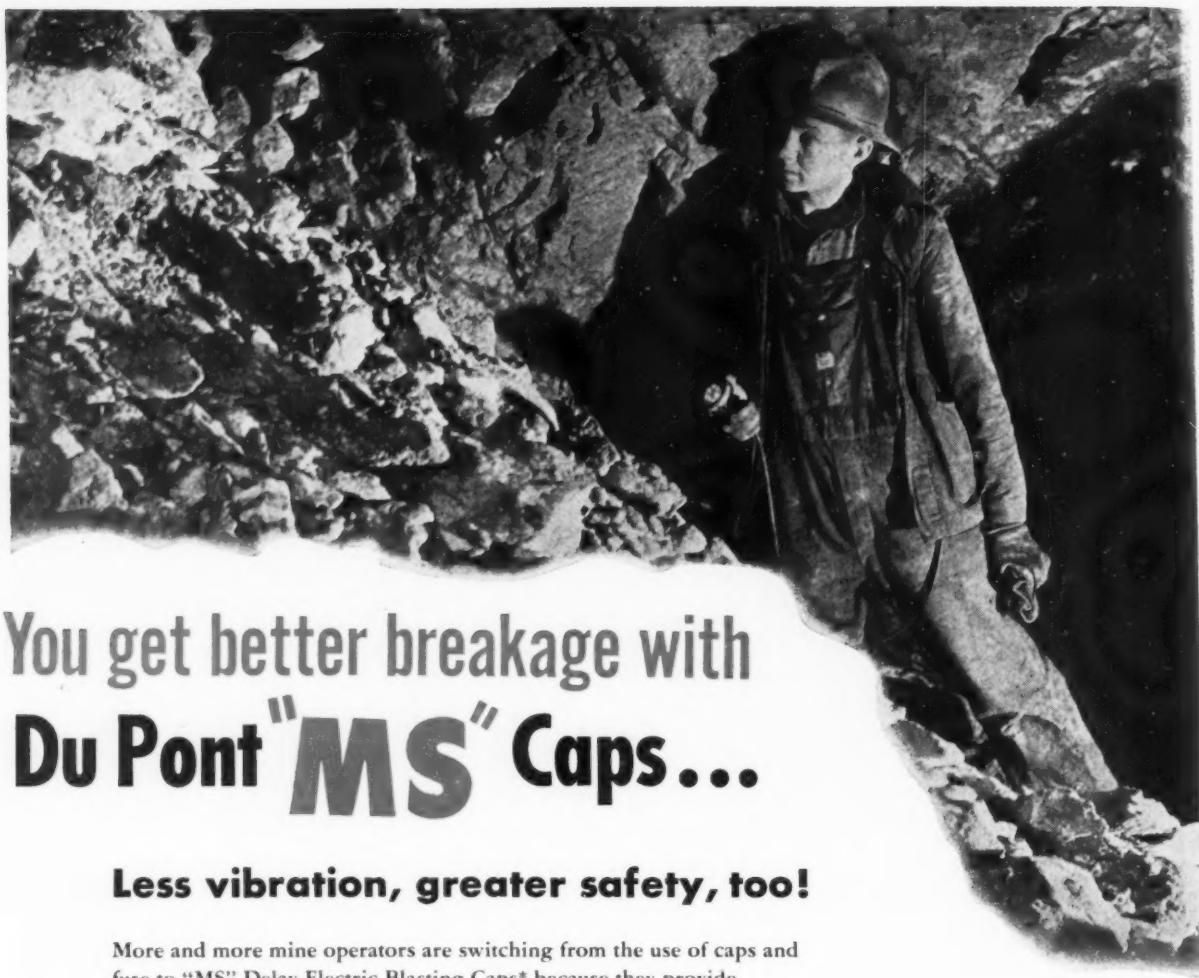


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Wilmington-Ransome Concrete Paving and Pavers

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You get better breakage with Du Pont **"MS"** Caps...

Less vibration, greater safety, too!

More and more mine operators are switching from the use of caps and fuse to "MS" Delay Electric Blasting Caps* because they provide superior fragmentation, greater safety and less vibration.

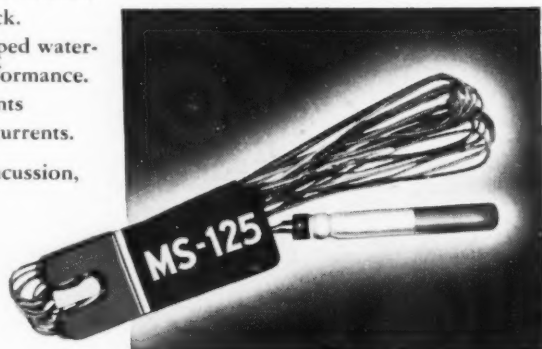
Even badly fractured veins break well when "MS" Delay Caps are used. And uniformly fine breakage makes slusher operation more efficient . . . reduces costly hand labor and secondary blasting.

Workers find "MS" Delay Caps as safe as they are efficient. Because of their short interval they leave no dynamite in the muck. Brightly colored nylon-insulated wires and double-crimped water-resistant rubber-plug closures make for dependable performance. Protective Cellophane-lined aluminum-foil-shielded shunts greatly reduce the risk of premature firing due to stray currents.

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Get complete information about "MS" (millisecond) Delay Electric Blasting Caps today. Talk to your Du Pont Explosives representative or write:
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*Available in 14 millisecond intervals of delay: MS-25, -50, -75, -100, -125, -150, -175, -200, -250, -300, -350, -400, -450 and -500.



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BLASTING SUPPLIES AND ACCESSORIES



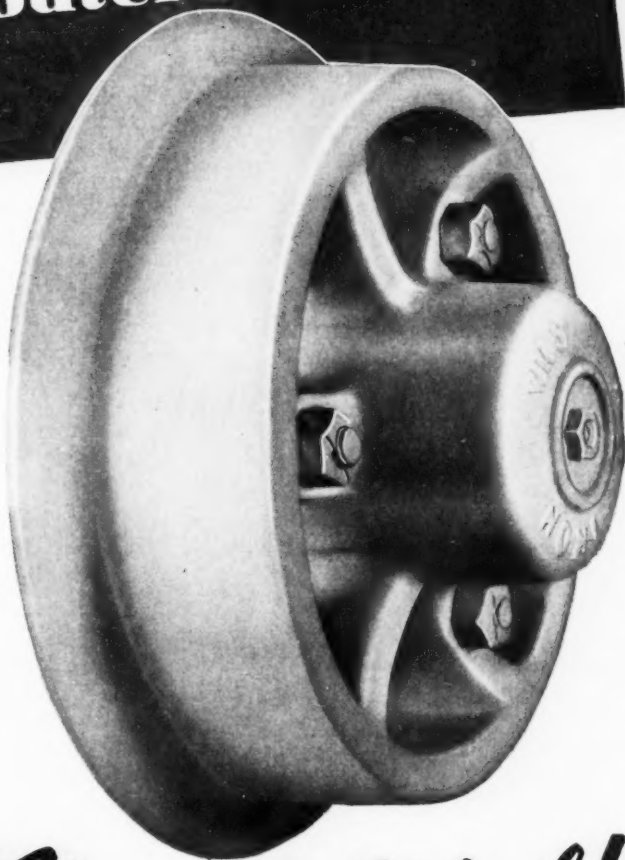
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MINING WORLD

Performance records prove...

**...with practically no
maintenance..you'll haul
up to 50% greater loads
on S-D "Floaters"...**

Tests conducted by independent engineering firms and performance records at the mine have proved that locomotives will pull up to 50% greater loads, when cars are equipped with S-D "Floater" Wheels, instead of wheels with other types of precision bearings. But this saving in power and time is only a portion of the profit you gain by using S-D "Floaters." When it comes to maintenance you really pick up profit because S-D "Floaters" literally "hate to be greased." One greasing in 5 years is often sufficient. Common labor can demount and remount a "floater" wheel easily . . . in less time than it takes to smoke a cigarette, because no adjustment whatsoever is necessary on the bearings. Add to this the fact that the big cause of bearing failure (bearings running too tight or loose) has been eliminated and you can understand why more and more operators are specifying S-D "Floaters" for all wheel replacements. For complete information, write Sanford-Day Iron Works, Knoxville, Tenn.

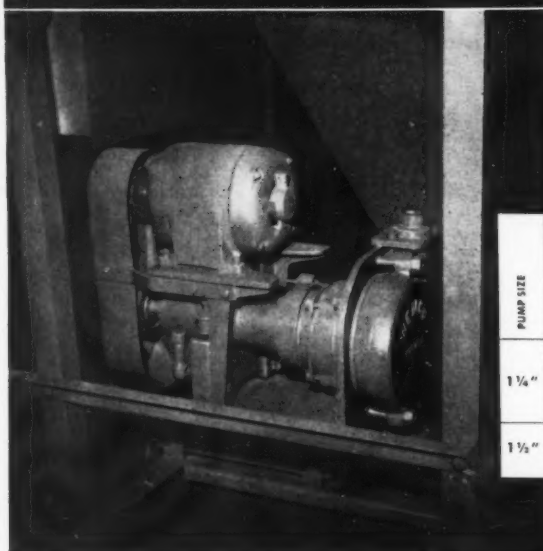
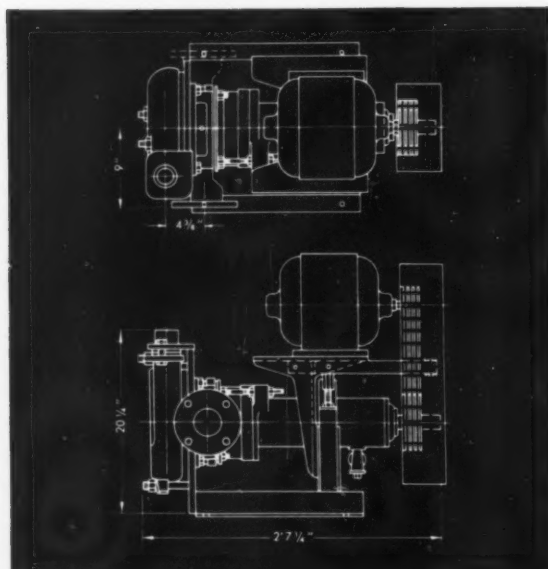


America's No. 1 Mine Car Wheel!

SANFORD - DAY IRON WORKS

MAY, 1951

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for efficient pumping of small pulp volumes

Now available in these new small sizes, WEMCO Sand Pumps fit the exact requirements of small mills, pilot plants and split circuits in larger flowplans. For pulp flow rates up to 100 gpm, these smaller pumps save in first cost, power consumption and upkeep. Like the larger WEMCO Sand Pumps, the new $1\frac{1}{4}$ " and $1\frac{1}{2}$ " units are complete with all the rugged features that mean reliable service.

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- **Hard alloys** in case, runner, follower plate and die ring minimize wear rate.
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- **Gravity intake** feeds directly to the impeller center to prevent intake sanding.
- **Welded steel base** is strong, non-breakable and light in weight.

SPECIFICATIONS

PUMP SIZE	INTAKE DIAMETER	DISCHARGE DIAMETER	STD. RUNNER DIAM.	MAX. PARTICLE SIZE	REQ'D INTAKE HEAD	CAP. IN U.S. GPM	HORSEPOWER AND RPM AT VARIOUS DISCHARGE HEADS									
							Horsepower at given capacity is for pumping clear water. For normal operations multiply this horsepower by the specific gravity of the pulp to obtain required horsepower for a given condition.									
							20'	30'	40'	50'	60'					
							RPM	HP	RPM	HP	RPM	HP	RPM	HP	RPM	HP
$1\frac{1}{4}$ "	$2\frac{1}{2}$ "	$1\frac{1}{2}$ "	9"	$\frac{1}{4}$ "	2'-4'	20	1055	.7	1280	1.4	1475	1.9	1650	2.6		
						40	1080	.8	1300	1.7	1495	2.0	1665	2.7		
						60	1115	1.0	1330	2.0	1520	2.2	1690	2.8		
$1\frac{1}{2}$ "	$2\frac{1}{2}$ "	$1\frac{1}{2}$ "	9"	$\frac{1}{4}$ "	2'-4'	80	1090	1.4	1300	2.1	1500	3.3	1675	4.8	1825	6.2
						100	1120	1.6	1320	2.3	1520	3.4	1690	5.0	1840	6.4

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UNITED STATES STEEL

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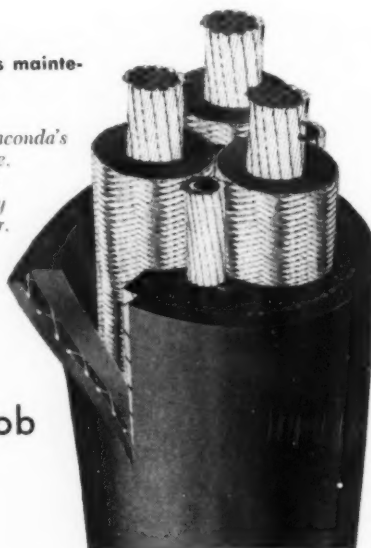
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This means more safety, longer service, less maintenance, fewer power interruptions and hence more production at less cost.

Investigate the outstanding performance of Anaconda's Butyl-Insulated Securityflex Type SHD Cable. Let Anaconda's shovel-cable service specialists demonstrate it. Get in touch with your nearby Anaconda Sales Office or Anaconda Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

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and the export edition
WORLD MINING

A Miller Freeman Publication

Published monthly except in April when publication is semi-monthly

MAY, 1951

VOL. 12 No. 6

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DRIFTS AND CROSSCUTS

No Help in Washington

With the emergency being thrust upon us there is now apparent the usual scramble among Washington Bureaus to seize control of directive powers. Editorial comment in the February and March issues of *Mining World* directs attention to this confusion. It is all very aptly summed up in the statement, "Symington's statements raises the interesting speculation as to whether, then, it might not be better to apply directly to RFC in the first place." The fact that the old voluminous loan application form is being used corroborates that conclusion. We have had different experiences with RFC and can thus begin to program our activities.

Recent meetings held in the west by Congressional Committees indicate that Congress is not satisfied with the results thus far. Instead of engaging in speculation let us consider small mine operations that are not getting and cannot get the help for which the plans were made. We are familiar with every foot of the ground about which we shall write.

The first property has had a production of some \$100,000 worth of good silver-lead ore. The dip and strike of the vein has been proved on surface for a length of over a mile. The work has been done in three shafts, ranging from 45 to 540 feet in depth, with about 450 feet of drifts and tunnels. A geological freak formed a small chamber from which was taken ores assaying in 1,000's of ounces of silver per ton. This gives a picture of what may be expected in the secondary enrichment zone.

The next property to the north is one of the oldest prospects in the district. It is opened by two tunnels and three inclines. Hand-sorted ores received a smelter settlement of over \$73.00 per ton during low prices for both silver and lead.

The third property to the north is on the side of the mountain and has over 2,500 feet of tunnels on two levels which are interconnected by raises. The tunnels show good mill ore. Hand-sorted ores have given good returns in copper, lead, zinc, and silver. The fourth property to the north has about 1,000 feet of tunnels on three levels. The ores are similar to those of the third property. Still to the north is a fifth property that, during different periods of activity, has produced ore valued at over \$1,000,000, mostly in copper. The needed prospecting by drilling has never been done.

Here we have five potential small mines where the continuity of the mineralization has been proven for several miles in length, and in a vertical section of 2,140 feet. None of them will meet the requirements set forth in Dr. Boyd's policy statement. The owners cannot appeal for private venture capital as none of them has the finances needed to meet SEC initial conditions for a permit.

One statement by Dr. Boyd is worthy of special attention, "the technical and managerial competence of the operator will also be considered." This statement can be and has been made to cover a very broad territory. Regardless of the owner's plans, after the loan is granted, the small mine operator will be given a work plan which he must follow. At times the supervising official in Washington, without coming on the ground, may alter the work plan that was made by his field engineer. If there is a mistake in the work plan the owner has no redress. In addition to all this, the owner has no control over the charges for administration of the loan which may be made by the loaning agency.

The Wanderer



CAPITOL CONCENTRATES

Subcommittee Hearings Point Up Slowness of Mineral Program

Recent hearings before the House Committee on Interior and Insular affairs brought out some startling facts and figures about the slow progress being made to increase production of defense minerals and metals.

Representative Clair Engle charged that the total results of the Defense Minerals Administration had been the signing of two contracts and the earmarking of \$10,000,000 for domestic mining development out of the \$600,000,000 authorized for over-all industrial expansion. James Boyd, administrator for the Defense Minerals Administration told the committee that no loans to mining companies had been recommended by DMA but that some loans would be made in the future from the \$10,000,000 exploration program.

● Gold Is On The March

The International Monetary Fund, dominated by the United States Treasury, is having a tough time sitting on the price lid, and various nations are trying to avoid the \$35.00 figure by all kinds of tricks. There even is a return to the old Amsterdam Bank techniques of centuries ago, whereby deposits can be made against a sort of negotiable warehouse receipt for gold deposited in, of all places, Casablanca, French Morocco. Such receipts can pass freely over our borders and be bought and sold, whereas the physical gold cannot. Even Canada, under pressure from its producers to increase the price of gold to meet the inflated costs of production, has added to its gold-production subsidy to the tune of some \$3,000,000. Secretary Snyder, however, still says "no" to domestic producers.

● U. S. Manganese Producers—Read and Weep!

A news dispatch from Washington states that the Export-Import Bank plans to lend \$30,000,000 to help finance a Brazilian manganese mine. The officials ignore the potential production of this important metal from western states and explain that this country no longer can obtain manganese from Russia. Principal imports it is said, now come from India and Africa.

Bank Chairman Herbert E. Gaston disclosed the Brazilian project in testimony before the House Appropriations Committee. He said that the Brazilian mining operation would provide this country with a less "vulnerable" supply of manganese for steel-making. Some of the Brazilian metal is scheduled to go into the Munitions Board's strategic stockpile.

The loan will be made to a joint United States-Brazilian corporation which holds mining concessions on a "manganese mountain" on the Paraguay River near Corumba in western Brazil, Gaston said. United States Steel Corporation owns 49 percent of the corporation. The rest is held by Brazilians.

● Both Tax Relief and Incentives Needed

The Copper Producers Industry Advisory Committee, which is supposed to advise the Defense Minerals Administration, met for a few hours early in March. According to a release issued the same day as the meeting,

the committee was of the "general opinion" that any incentive program, "such as a guaranteed minimum floor on prices," would not increase production "to the extent necessary to meet our rearmament objective." (At this point every little bit helps!)

The committee recommended that "our production goals in the case of copper can be most readily attained by some form of tax relief which would provide a quick return on capital investment."

Can you see yourself contracting with the government for your copper over a five-year period at the market, the program involving the expenditure of half a million dollars and your production cost being 24 cents per pound, and no floor under your price? Ever notice what happens to prices now and then? If the price dropped to 18 cents the next year after you got into production, what comfort would you get out of a tax-relief program?

What program of tax relief was proposed which would give such miraculous results? Silence reigns on this point.

As a matter of fact, the mining industry at this time can stand both a program of tax relief AND incentives.

● Talk Does Not Produce Metals

On April 5, 1951, James Boyd of DMA told a House subcommittee on mines that the copper situation now is "possibly a little more critical than six months ago." This statement, coming just three days short of the seven months after enactment into law of the Defense Production Act of 1950, leads the nation to serious thought. More than newspaper-promised help from Washington to miners is needed to reopen mines.

● Canada to Increase Gold Subsidy

The Canadian government has moved to bring legislative machinery into operation to provide between \$10,000,000 and \$11,000,000 in subsidies in 1951 for Canada's gold-mining industry.

In a notice on the Commons order paper, Mines Minister Prudham said he will bring in a resolution to amend the Gold Mining Assistance Act and incorporate the new payment formula announced by Finance Minister Abbott early in March. The resolution also will cover amendments to provide subsidy payments for the last quarter of 1950.

The main point in Abbott's plan is that mines with a production cost of more than \$22.00 an ounce will be subsidized on not less than one half of their 1951 production that is sold. In the previous scheme the minimum was one third.

Western miners suggest that the United States government could learn something from Canada's handling of its mines. Canada has progressed rapidly in metal and mineral production since her progressive program was started.

● Concurrence from the Northwest

Once again the announced plans of the Defense Minerals Administration for aiding the domestic mineral industry have come under fire from a mining spokesman. Wellman Clark, prominent Spokane mining attorney, told a meeting of mining men in Spokane that "We

should try to do something for the small mine operator. Only the big mines will benefit under present Federal-aid policies." He then urged that the Federal government diamond-drill meritorious mining prospects.

● Another Non-Productive Job for the Miner

For those miners of strategic minerals who are still able to produce under a United States ceiling price lower than the corresponding world price a new job has been added. It is a repetition of the "forfeiture" system of aiding the mining industry so prevalent in Washington. The latest form, to be filled out by the tungsten miner, is that known as Form MF-6 (April 1951), Budget Bureau No. 42-R1055. The form starts as follows: "This inquiry is mandatory under the authority of the Defense Production Act of 1950. Please complete and return four copies of this form to the Bureau of Mines, Washington 25, D.C.," and ends, "Title 18, U.S. Code (Crimes), Section 1001, makes it a criminal offense to make a wilfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction." Latest word from Washington hasn't indicated that it is mandatory for the miner to apply for the forms with any of his applications to DMA.

● Accelerated Amortization to Be Graduated

The only companies which will get 100 certificates of accelerated amortization are those where there is a clear prospect that the economic usefulness of the facility will end with the emergency. DPA will scale down all others as it may seem expedient. Mining seems slated for around 80 percent.

● Subsidy Plan Would Make Dallas Happy

C. Donald Dallas of Revere Copper and Brass, who makes most of the noise about taking off the copper tariff, suggests that the government pay a subsidy to the three large U.S. firms producing copper in Chile. This would be done by the government's buying all the copper at, say, 28 cents, or whatever price would make the mining companies happy, then reselling the metal to Dallas at the domestic market price, thus making Dallas happy also. Such a loss absorption is permitted under the DPA. How about a similar plan for domestic producers, Mr. Dallas?

● Can You Name Them?

Few people realize how many government agencies, divisions, corporations and committees have a finger in the metals and minerals pie. And fewer know the rivalry between many of them to dominate the foreign or domestic field or both, and to set policy.

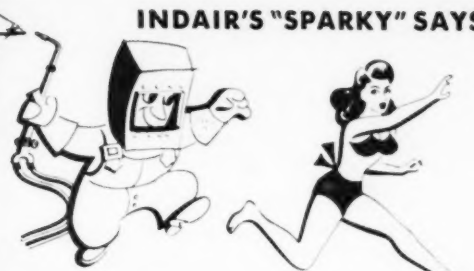
Even the Quiz Kids could not give the full names of all of these: ODM, DPA, DMA, MB, NPA, GSA, EPS, ECA, IRMO, OIT, MDAP, NATO, ITDC, PMPC, CCC, AMP, RFC, EIB, and VMC. There may be more and are if one should include the various industry advisory committees.

COMING CONVENTIONS

April 30 through May 4, 1951. NATIONAL MATERIALS HANDLING EXPOSITION, International Amphitheatre, Chicago, Illinois.

May 21 and 22, 1951. AMERICAN ZINC INSTITUTE, Statler Hotel, St. Louis, Missouri.

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Lead-zinc ore is mined in this openpit at the Snapp mine near Joplin, Missouri. On the pit's far rim are the tailing pile, mill, inclined ore-car ramp and "Dumpton" dumping ramp.

SNAPP MINE STEPS UP OUTPUT OF LEAD-ZINC ORE IN JOPLIN AREA

In late 1949, George W. Potter of Joplin, Missouri, former vice president of Eagle-Picher Mining & Smelting Company, purchased all physical properties of the Kansas Exploration Company. Included in this purchase were the Snapp mine and mill north of Oronogo, Missouri. Then, early in 1950, Potter sold his holdings to the Federal Mining & Smelting Company. Subsequently Potter and Dewey Sims, prominent Miami, Oklahoma, mine operator, formed a partnership and leased the Snapp mine from Federal Mining. Since leasing the mine they have test drilled a large acreage of ground, drilling many holes to a depth of 200 feet. Lead-zinc mineralization was found at depths from 25 to 126 feet. Overlying the ore is soapstone and shale.

Openpit Mining

The partners decided to strip the overburden and mine the ore in an openpit. To date they have moved more than 1,200,000 cubic yards of overburden and ore and are now mining and milling 1,000 tons of ore daily. The overburden has been removed by a dragline, and Caterpillar drawn carryalls. A bulldozer is used to pile ore and

waste in separate areas. The waste is picked up with the carryall and the ore is loaded into 10-ton capacity "Dumpton" by a $\frac{3}{4}$ -yard shovel. The "Dumpton" haul the ore out of the pit and dump it into a car. This car is hauled to the top of the mill and ore is dumped onto a grizzly which separates the coarse waste from the finer ore. The un-

dersize drops into a storage bin.

Washing and Screening

The key unit in the mill is a revolving screen, similar to the trommel screen on a gold dredge in which the ore is washed. About 2,000 gallons of water per minute at a pressure of 70 pounds per square inch is used for washing the

In this revolving screen 2,000 gpm of water at a pressure of 70 pounds per square inch is used to wash and break up the soapstone-bearing lead-zinc ore.





Ore is hauled from the pit's bottom to the mill's dumping ramp in 10-ton capacity "Dumptions." A 34-yard shovel loads the finely broken ore.

fine waste from the ore and for breaking up the soapstone. Previously, log washers have been used in treating this type of ore in the district, such as at the openpit Crown Crest mine seven miles east of Joplin. A log washer was originally planned for the Snapp mill but after determining that the log washer overflow would have to be diluted before jigging the decision was made to use the high-water-pressure, large-volume washing screen. The washing screen is six feet in diameter and 20 feet long. The first eight-foot section is solid plate but an interior lining of two-inch-diameter punched plate breaks up and rolls the feed as it travels through this section. The

next four-foot section has 9 16-inch-diameter holes and the last eight-foot section, two-inch holes. The plus-two-inch washed oversize from the screen discharges onto a conveyor belt. All mineralized rock on this belt is hand-sorted out and dropped onto a second conveyor belt. The waste remains on the picking belt and goes to the waste dump. The hand picked oversize and the ore washed through the two-inch holes are conveyed to a 10-inch jaw crusher. Crusher discharge is screened on a 9 16-inch screen. The minus-9 16-inch product of the washing screen and the second screen are fed to the rougher jigs.

There are two six-cell, 36 by 48 inch, rougher jigs and one, seven-

cell, 36 by 36 inch, cleaner jig in the mill. Rougher jig middling is ground in a 42-inch roll and returned to the rougher jig. The cleaner jig sand is treated on four Buchart tables and the slime is treated in a 12-cell, Denver, "Sub-A" flotation machine.

The galena and sphalerite are found in relatively coarse crystals and can be separated from the waste without fine grinding. Ore of this type is called a "free ore" in the Joplin district. The zinc-lead ratio is about three to one. Zinc concentrates are shipped to the Bartlesville, Oklahoma, zinc smelter of the National Zinc Company and the Coffeyville, Kansas, pigment plant of the Ozark Smelting & Mining Company. The lead concentrate is shipped to the Federal, Illinois, plant of the American Smelting and Refining Company.

Equipment Brings Results

Potter and Sims have opened a new era in Tri-State mining. By a combination of equipment and processes used in other mining districts they have proven that large scale openpit mining of low grade ore is economically feasible and that "soapy ores" of the district can be easily and cheaply milled. With the increased demand for both lead and zinc the Snapp mine has a bright future. The success of the Snapp operation calls for the reexamination of other low grade ore deposits at shallow depths in the district.

In the pit a Caterpillar dozer is used to loosen the ore and waste and pile them for loading. On the skyline can be seen a dragline and tractor-drawn scraper used for waste removal.





The Grand Junction, Colorado, mill of the Climax Uranium Company is the first uranium mill built in the United States primarily for uranium recovery.

CLIMAX URANIUM CO'S. NEW MILL IS FIRST TO ACID-LEACH CARNOTITE ORE

When the series of five pre-dawn atomic explosions at Frenchmans Flat, Nevada, in February, lighted the skies for a distance of 300 miles, atomic history was made. At the same time in Grand Junction, Colorado, another atomic age development, perhaps of equal importance, was taking place. The Grand Junction development was the initial operation of the Climax Uranium Company's mill—the first mill to be built in the United States primarily for uranium recovery. Previously all domestic uranium had been recovered as a by-product from mills originally built to recover vanadium, or from modified or rebuilt vanadium mills processing Colorado Plateau vanadium-uranium ores.

Climax Uranium Company, under the direction of E. J. Duggan, vice president, and Blair Burwell, general manager, was able for the first time to design and build a plant for maximum uranium recovery with vanadium production of secondary importance.

Acid Leaching

Climax's new plant is also the first in the United States to use a primary acid-leach circuit and a Colorado Iron Works Company's split-draft, multiple-hearth Skinner

roaster. The flowsheet, in brief, is as follows: Carnotite ores from the company's mines and purchased ores are dumped on an eight-inch grizzly. Undersize falls to a pan feeder for delivery to a Tel-smith crusher. The crushed ore is stored in a primary ore bin and fed, as needed, to a 4 by 10-foot Marcy rod mill operating in closed circuit with a 60-inch Akins classifier. Grind is to grain size (48-mesh). The classifier overflow is deslimed in a Dorr hydrosizer, the minus-150-mesh slime is dewatered in a 50-foot Dorr thickener and filtered in disc filters. The sand product from the hydrosizer is leached in filter-bottom tanks with an acid solution. The leached sand is pumped to the tailing pond.

The slime filter cake to which sodium chloride (salt) has been added is dried in a multiple-hearth drier and is then fed to a six-hearth, 20-foot-diameter, split-draft Skinner roaster. The roaster's function is to recover the vanadium and to generate hydrochloric acid from roaster gases which are treated in scrubber towers. The resultant acid solutions are used to make up acid-leach solutions. Hot roaster calcine drops to a Stearns-Roger Manufacturing Company's Baker cooler. The cooled calcine is ground in a ball mill and conveyed to a top-loading

filter where the water soluble vanadium solution is removed. The residue from the filters is leached with hydrochloric acid and the pregnant solution, which contains the uranium, is treated for uranium recovery.

The vanadium-bearing liquors are treated by careful Ph and temperature control and sodium hexavanadate (red cake) is precipitated. The red cake is fed to a fusion furnace where H₂O is driven off and the resultant sodium pyrohexavanadate (87.0 percent V₂O₅) is tapped to a water-cooled, rotating casting wheel. The black concentrate from the wheel is packed and shipped to ferro-vanadium plants.

Flexible Flowsheet

Flexibility is the keynote of this mill. It can treat any combinations of low or high uranium-vanadium ores. High lime ores can be treated in the acid-leach circuit. Only a small part of the total mill feed will be roasted—an expensive process.

The plant makes commercial treatment of low grade Colorado Plateau ores possible for the first time. Increased amounts of uranium are available for the ever-expanding industrial and war-time atomic energy program.



Authors, A. W. Mathews (left) and Clarence H. Sleeman are graduates of the Michigan College of Mining and Technology. Mathews has been employed by several iron mining companies since his graduation in 1940. Sleeman has worked for Inter-State Iron Company since 1947 and is now assistant chief general mining engineer.



Inter-State Iron Company's Hill Annex concentrating plant at Calumet, Minnesota. Crude ore is delivered over the trestle at the left. The crane extension of the trestle, at the right, facilitated new equipment placement in 1950. The coarse tailing is stacked outside the plant. As the pile grows a portable belt stacker will be used to extend and raise the pile.

AN OPERATING REPORT ON HILL ANNEX MINE'S LEAN IRON ORE CONCENTRATOR

By A. W. Mathews
and C. H. Sleeman

The Hill Annex mine, operated by the Inter-State Iron Company, a subsidiary of Jones & Laughlin Steel Corporation, is located at Calumet, Minnesota, on the Mesabi Iron Range. Development of the Hill Annex mine as an openpit was begun in 1914 with the first ore being shipped in 1917. Direct shipping ore was mined exclusively until 1920, when a two-unit washing plant was erected. Each unit was capable of handling 350 long tons per hour of feed. In 1929 the metallurgical flowsheet and equipment were revised for more efficient separation. In 1935 an additional unit of about the same size was added. During the period from the beginning of mining through the 1949 ore season, 15,350,000 tons of direct shipping ore and 30,491,000 tons of wash-ore concentrates were shipped.

Selective Beneficiation

Then, having exhausted all of the direct shipping ore and most of the wash ore, the necessity to beneficiate leaner ores by some more selective process became evident in order to maintain production schedules. The Hill Annex and Negaunee research laboratories made extensive tests on samples representing the remaining pit ore, the lean ore stockpiles, and the ore to come from pit extensions, and a decision was made to process the ore in the manner shown on the accompanying flowsheet. The plant

would utilize two HMS circuits, one for minus-1½-inch, plus-⅝-inch fraction, one for the minus-⅝-inch, plus-3/16-inch fraction; and the minus-3/16-inch would be treated by abrasion milling and Humphreys spirals.

The Western Knapp Engineering Company was retained to develop a flowsheet, specify equipment, design the new layout and present construction drawings.

After the completion of the 1949 operating season, all equipment and existing floors were removed from the two original washing units, and the new HMS machinery and steel work were installed. All supervision, fabricating of tanks, chutes, hoppers and structural steel, and erection were performed by Hill Annex mine personnel. To facilitate handling

heavy machinery and structural materials, the runway for the existing, 20-ton, overhead plant crane was extended 25 feet beyond the plant over a railroad spur. The building was remodeled and the concentrating machinery was installed, much of the work being completed during the coldest months of the winter. After the beginning of the 1950 ore shipping season, to continue construction with a reduced force was necessary, since the existing No. 3 unit was put into wash-ore production. The HMS portion of the new mill was given a trial run on July 21, 1950. After making a few minor revisions, production was begun on August 9th. Until October 3rd, when the ball mill was started, the fines from HMS were classified in the two existing Dorr bowl classifiers.

Metallurgical Results At Hill Annex HMS Plant for Season of 1950 Calculated for Net Crude Feed¹

Point of Flowsheet	Product & Description	C ₂ of Feed by Weight	Iron Units by C ₂	Weight in Long Tons	Analysis of Product		Fed To
					Dry Fe	SiO ₂	
NET CRUDE		100.0	100.0	419,339	40.04	39.98	Fine Screen
FINE SCREEN							
	Minus ¾-inch	65.17	57.49	273,300	35.30	46.37	Classifier Circuit
	Plus ¾-inch & minus ¼-inch	34.83	42.51	146,039	48.91	25.97	HMS
CLASSIFIER CIRCUIT							
	Tailing Concentrate ²	37.35	18.52	156,580	19.84	68.94	Waste
		27.84	38.91	116,720	56.64	16.10	Shipped for sintering ³
HMS							
	Float Reject Concentrate ³	10.11	6.99	42,419	27.75	57.36	Waste
		24.70	35.58	103,620	57.57	13.12	Shipped ⁴
TOTAL CONCENTRATE ⁴							
	Classifier Plus HMS	52.54	74.49	220,340	56.76	14.70	

¹ 438,699 tons total feed to plant assayed 39.58% Fe. From this 19,360 tons of plus-seven-inch rock assaying 29.56% iron was screened out and rejected.

² Assays 0.040% P, 0.12% Mn, 0.80% Al, and 11.36% H₂O.

³ Assays 0.048% P, 0.12% Mn, 0.70% Al, and 7.23% H₂O.

⁴ Assays 0.044% P, 0.12% Mn, 0.80% Al, and 9.42% H₂O.

⁵ 61.50 tons per railroad car.

⁶ 58.88 tons per railroad car.

During the remainder of the 1950 operating season, tests were conducted on a pilot circuit, using the two 78-inch classifiers and the 8 by 9 foot ball mill. A portion of the ball mill product was fed to a test group of 18 Humphreys spirals and the remainder was classified as before.

1. The Hill Annex plant was the first to utilize Hardinge drum separators on both coarse and fine HMS circuits.

2. The medium clean-up floor and bucket-elevator sump

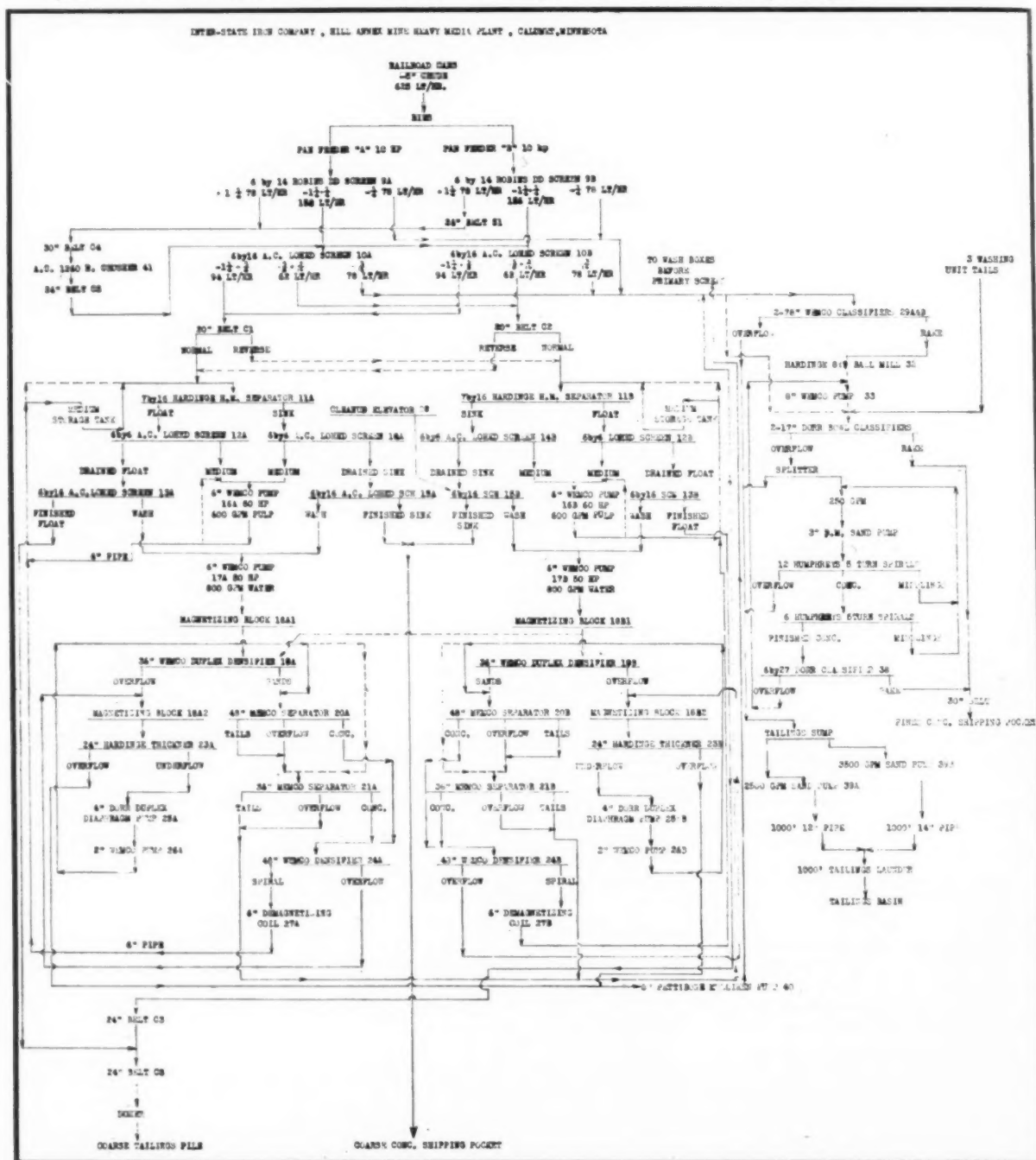
are located on the third floor of the plant, 30 feet above the ground, instead of on the ground, as is usual.

3. Fine (minus-3/16-inch) and coarse (plus-3/16-inch) concentrate are loaded for separate shipment, as the finer material is to be sintered. The silica content in each must be held to a maximum of 12 percent.

4. Individual, Westinghouse AV, variable-speed drives are

used on separators and medium densifiers, instead of one main DC generator and variable speed DC motors.

During the 1950-1951 winter repair season, plant crews installed two 4 by 12 foot, 10-mesh scalping screens and 90 Humphreys spirals to complete the fines treatment unit. Some changes were made in existing equipment, chutes, and launders to eliminate bottlenecks and trouble points which showed up during the 1950 operating season.



Muriel Sibell Wolle Describes

CARBONATE ON THE FLAT TOPS



If the Utes hadn't been on the war-path, Carbonate Camp would have gotten off to an earlier start. The site was unexplored territory in 1878 when two Leadville prospectors crossed the Ute reservation in search of ore and found on the surface of the ground evidences of carbonate deposits. The country where they lay was high on top of the Flat Tops of Colorado; a wild, almost primitive region, known best today to hunters and fishermen who pack in to their favorite campsites and occasionally flounder out through deep, fresh snow, if they have stayed too long in tricky, autumn weather.

All through the spring and summer of 1879, daring prospectors worked their way up the steep rock-walled canyons above the Colorado and Eagle rivers to the high, level heights of the Flat Tops—10,000 to 11,000 feet above sea-level—where outcroppings were found, near the head of the south fork of the White River.

Although the men knew they were on Indian land and were on the alert for ambush or attack, nothing happened and they planned to stay near their prospects during the winter. Then, without warning, in September 1879, came word of the Meeker massacre.

The White River Agency, where the massacre occurred, was all too close for comfort and all but the hardiest of the miners scurried out of the hills and returned to more populated localities. Those who decided to stay retreated to the foot of the rocky cliffs, 10 miles southeast of their camp, and built a stockade and blockhouse which they called Fort Defiance in which they spent the entire winter.

Spring brought new hordes of prospectors to the area and a camp called Dotsero, situated on the Colorado River at the foot of the trail to the Flat Tops, became crowded. A small army of impatient men, surrounded with their supplies and pack animals, awaited the melting of the snow which prevented them from pushing up the narrow, muddy

trail to Coffee Pot Springs and beyond to the embryo campsite on top of the mountains.

Much prospecting was done during the spring of 1880 when Charles A. McBriarity and George P. Ryan sank shafts in which were found large quantities of ore containing lead and silver. The Ryan shaft became the best known and was developed to a depth of 102 feet, "the last 15 of which were cut through a solid body of carbonates." W. C. Wynkoop and W. L. Cooper also made discoveries and before long many prospect holes had been sunk, all within three quarters of a mile of the initial claims. On the strength of these strikes exaggerated stories of the rich lodes were circulated and men stumbled over each other to reach the diggings. The ore was genuine lead carbonate and was found in fissure veins in limestone. At Coffee Pot Springs both hard and soft carbonates were discovered in contact veins and at Deep Creek, four miles northeast of the camp, more carbonates were exposed.

During that summer hundreds visited the camp, "dug pit holes and procured assays of minerals" but the

ores were too low grade to warrant development and "nothing was done to encourage a permanent encampment . . . Up to the spring of 1883 not a single house or improvement of any kind was made at the camp."

That spring however, the Carbonate Townsite Company filed on 640 acres of land and surveyed 160 acres. The town plat was impressive—First through Sixth streets running at right angles to Teller, Lafayette, Main, Best, and Dailey streets, all laid out in a well-forested table-top area. By the time a few lots were sold, Carbonate City was well advertised as the "center of the mining region" and was "destined to rival if not surpass Leadville." Its promoters expatiated upon its abundant timber, its proximity to coal fields and its water supply which was said to be "equal to any demand."

In February 1883 Garfield County was created by the state legislature and by June the mushroom camp of Carbonate was designated the county-seat. For four months it held this honor. A postoffice was established, a "star route" mail service

Continued on Page 85

All that is left of Carbonate City, first county seat of Garfield County, Colorado.



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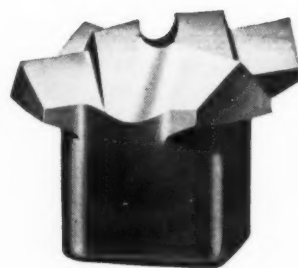
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ACTIVITIES OF U. S. MINING MEN



TOM LYON has been appointed director of the Supply Division of the Defense Minerals Administration, Washington, D.C. Lyon had been assistant chief of the copper branch since January. The Supply Division functions as the programming

and planning unit of the DMA. Lyon retired from the International Smelting and Refining Company, Salt Lake City, Utah, in March, 1950, after serving with the company for 28 years. He is a graduate of Montana School of Mines, and a member of the AIME and the American Petroleum Institute.

Thomas C. Beattie has been appointed general superintendent of the Fairless Works of National Tube Company, a subsidiary of the U. S. Steel Corporation.

C. Jared Ingersoll of Philadelphia has been elected a director of the United States Steel Corporation to succeed Walter S. Gifford, resigned to become Ambassador to Great Britain. Ingersoll is a director of several other companies, including Phelps Dodge Corporation.

S. C. Harvey has succeeded **C. R. Oliver**, resigned, as manager of mines, Utah Fuel Division, Kaiser Steel Corporation. His headquarters are Salt Lake City, Utah.

Robert C. Pruess is now working for the Climax Uranium Company at Grand Junction, Colorado. He had been engineer for the Sidney Mining Company, Kellogg, Idaho. Pruess is a Colorado School of Mines graduate.

Elmer E. Johnston has been elected president of Silver Dollar Mining Company, Wallace, Idaho. He had been in charge of the company since last September, serving the remainder of the late C. O. Dunlop's term.

Conrad W. Thomas, former director of safety at the Los Alamos Scientific Laboratory, atom research plant in New Mexico, has been appointed mining engineer for Santa Fe Railway's Coast Lines, with headquarters at Los Angeles, California. He succeeds **Thomas O. Evans**, who will concentrate on Santa Fe's "Operation Haystack" uranium ore discovery near Grants, New Mexico. Thomas is a member of the executive committee of the Southern California section, AIME, a graduate of the University of California College of Mining, and has worked for various mining companies in California, Colorado, and Nevada. He also spent five years in Latin America, first with Cerro de Pasco Copper Corporation in Peru, later as construction superintendent for the Panama Canal, general mine superintendent for the Itabira iron ore operations in Brazil and in consulting work at Rio de Janeiro.

R. L. McCann has been elected president of New Jersey Zinc Company, New York, succeeding **Henry Hardenbergh**, who has been elected chairman of the board of directors. Mr. McCann had been

general manager of mines, then assistant to the president, and finally a vice president before his election to the presidency. Mr. Hardenbergh had been president from 1943.

Leo H. Duriez, manager of the Bayard department of the United States Smelting, Refining and Mining Company, retired at the start of the year. He now lives in California. A native New Mexican, Duriez spent much of his life mining in Grant County. Before working for USSR he was employed by the Burro Mountain branch of the Phelps Dodge Corporation at Tyrone.

Robert E. Prittinen, mining engineer, has joined the engineering staff of the Jones & Laughlin Ore Company and will be employed at the Tracy mine, Negaunee, Michigan. **Richard W. Maki**, engineer, has been made instrument man at the Tracy and **Roy M. Grigg** has been added to the company's research laboratory.

Tom Erspamer, mining engineer of Hurley, Wisconsin, has joined the Pickands Mather & Company engineering staff at Hibbing, Minnesota. **Lawrence Woodworth** of Ely, Minnesota, engineer at the company's Zenith mine has been transferred to the Newport mine at Ironwood, Michigan, as assistant mining captain.

Leslie M. Cassidy was elected chairman of the board and chief executive officer of Johns-Manville Corporation and **Adrain R. Fisher** was appointed president to succeed Cassidy at a recent meeting of the board of directors at New York. Cassidy replaces the late **Lewis H. Brown** who died February 26, 1951. **Clifford F. Rassweiler**, vice president of research and development and vice chairman of the board, will continue directing the company's new Planning Board and will serve as assistant and alternate to the chairman.

William H. Harrison, administrator, Defense Production Administration, has announced the appointment of **Major General Thomas F. Farrell** as deputy administrator for Resources Expansion. He will coordinate and direct the development of adequate physical resources for defense needs with particular emphasis on early completion of facilities designed to increase basic resources.

John J. Judge, regional director for the Department of Commerce, has appointed **E. J. Spielman** as regional attorney and **A. G. Keating** as production engineer for the National Production Authority. Headquarters for the men are at San Francisco, California. Keating is a production engineer and has had his own engineering consulting business since the war.

Dale E. Doty, Assistant Secretary of the Interior, opened the first meeting of the Chromite Users Industry Advisory Committee of the Defense Minerals Administration in March at Washington, D.C. Besides **Tom Lyon**, director of the Supply Division, and **Philip R. Bradley**, chief of the Manganese-Tungsten-

Chrome Branch of DMA, the following men attended the meeting: **W. C. Keeley**, Vanadium Corporation of America, New York; **R. E. Knight**, Kaiser Aluminum & Chemical Corporation, Oakland, California; **J. H. Spillane**, Union Carbide & Carbon Corporation, New York; **T. F. Olt**, Armco Steel Corporation, Middletown, Ohio; and several others.

James Boyd, **James Douglas**, and **Tom Lyon**, respectively administrator, deputy administrator and director of DMA's Supply Division, met representatives of the copper-producing industry recently at a meeting in Washington, D.C. These men included **John C. Kinnear** of Kennecott Copper Corporation; **Robert Dwyer** of Anaconda Copper Mining Company; **O. H. Johnson** of Idaho Mining Company; **Frank E. Barnett** of Vermont Copper Company; **W. W. Lynch** of Calumet & Hecla Consolidated Copper Company; **Morris F. LaCroix** of Copper Range Company; **Simon Strauss** of American Smelting and Refining Company; **E. R. Dickie** of Bagdad Copper Company; **C. D. Tripp** of Consolidated Coppermines Corporation; **H. I. Grimes** of Banner Mining Company; **Milton A. Caine** of Miami Copper Company; **R. G. Page** of Phelps Dodge Corporation; and **Frank P. Knight, Jr.**, of Christmas Copper Corporation.

Eric G. Erickson and **Edward W. Buel** each have been assigned to governmental jobs with headquarters at the U. S. Bureau of Mines' Spokane, Washington, office. Erickson has been made a field engineer for the Defense Minerals Administration. Buel has joined the Bureau's mineral industry branch and will conduct surveys in Montana.

George W. Hallock of Grass Valley, California, has been reappointed to the State Mining Board by Governor Earl Warren. **E. C. Deisne** also was reappointed. Hallock is president of the California Hydraulic Mining Association.

ARTHUR P. CORTELYOU has been appointed general manager of United States Vanadium Company, a division of Union Carbide and Carbon Corporation, New York, according to **W. E. Remmers**, president. Cortelyou, a graduate of the University of California, has been with Union Carbide since 1930. He will headquarter in New York.



F. A. Sifton of Dove Creek, Colorado, is moving to Phoenix, Arizona, for an indefinite time to try to recover from the effects of two heart attacks he has had. He is the organizer of F. A. Sifton, Inc., which mines uranium in Arizona and Colorado.

Carl M. Fellman is president, **A. L. Johnson** is vice president and **W. M. Somppi** remains secretary of the Gogebic Range Engineers' Club. They were elect-

ed at the annual meeting held at Ironwood, Michigan.

Gene Galassini began work in mid-March as deputy state inspector of mines in the Santa Rita area, New Mexico. Galassini formerly was shaft foreman in shaft-sinking operations for the Utah Construction Company in Carlsbad, and before that had 10 years' experience in shaft-sinking operations in and around Silver City.

Bruce Kennedy, Lansing, has resigned as Michigan state geologist and assistant mine appraiser with **Franklin Pardee**. He has accepted a position with **Pickands, Mather & Company** and will be located at Ironwood. **Harry J. Hardenberg**, division economic geologist, has succeeded Kennedy.

Joseph H. Hedges has been made special assistant to **James Boyd**, Director, U. S. Bureau of Mines. Hedges has been with the Bureau for 25 years. He will carry out special assignments such as expediting the Bureau's programs for producing strategic materials.

Sidney A. Thomas and **Edward S. McHale** have been appointed pit foremen at the Hull-Rust pit, and **Richard H. James** has been made plant foreman at the Sherman mine, Hibbing-Chisholm district, Oliver Iron Mining Company, Minnesota.

Opal Kane, former general superintendent of Armco Steel Corporation's mining division, is now manager of the division, and **J. S. Chapman** is now assistant to the manager but will continue in charge of personal relations. Kane joined Armco as a general foreman in 1943 and Chapman as a tippie foreman in 1937.

Arthur O. Wilson has moved from Ophir, Colorado, to Port Clinton, Ohio, where he is employed as mining engineer on a shaft sinking program of the United States Gypsum Company.

Charles E. Melbye has resigned from the Anaconda Copper Mining Company, Tecopa, California, and is now employed as mining engineer with Telluride Mines, Inc., Telluride, Colorado.

W. H. H. Cranmer, president and general manager of New Park Mining Company, has been named president and director of the East Utah Mining Company, Park City, Utah. Voting control of East Utah was obtained by New Park recently, resulting in the assignment of New Park officials to east Utah posts; others besides Cranmer include **R. C. Wilson**, treasurer and director; **Fred A. Moreton**, vice president and director; **Robert L. Cranmer**, secretary and director; **Clark L. Wilson** and **Orvel Bonnet**, directors.

Russell Thomas has been made underground foreman at the Oliver Iron Mining Company's Soudan mine on the Vermillion range of Minnesota. **J. L. Strong**, mining engineer with Oliver since 1908, retired recently. He will continue to live in Duluth.

Frank J. Smith, vice president of Oglebay Norton & Company, is established in the company's new quarters in the Christie Building, Duluth, Minnesota. The staff in the new quarters includes **I. H. Wynne**, **H. K. Martin**, **Dan S. Young**, **Peter Warhol**, **W. W. Viebahn**, **A. J. Windl**, **O. Jalmer Anderson**, **August F. Torreano**, **John F. Atkinson**, **F. E. McIntire**, and **Edward A. Lambert**.

Lawrence Woodforth of Ely, Minnesota, has left his job as engineer at the Zenith iron mine of the Vermillion Mining Company and is now assistant mining cap-

tain at the Newport iron mine of the Youngstown Mines Corporation at Ironwood, Michigan.

M. J. Gleason was transferred from field superintendent of drilling operations for the E. J. Longyear Company at Hibbing, Minnesota, to the company's Minneapolis offices as assistant manager of the contract drilling division. He was succeeded at Hibbing by **E. G. Tucker**.

M. J. Jorgensen is superintendent of the Triumph Mining Company's new lead-zinc concentrator at Hailey, Idaho.

George Gedge has been made safety engineer for the Calumet division, Calumet & Hecla Consolidated Copper Company, Calumet, Michigan. He succeeds **J. W. Alt**, who resigned. Gedge had worked in Ontario for the Hollinger Consolidated Gold Mines, Ltd.

C. E. SCHWAB, mine superintendent for Bunker Hill & Sullivan Mining and Concentrating Company, Kellogg, Idaho, was one of many Pacific Northwest industrial leaders who met at Pullman, Washington, for the Third Annual Pacific Northwest Industrial Waste Conference, March 22. Discussions centered on industrial waste handling problems and the control of water and air pollution. The Conference was sponsored by the Division of Industrial Services of Washington State College's Institute of Technology. Among speakers in the Mineral Session, besides Mr. Schwab, were **J. P. Spielman**, Dean of the School of Mines; **H. E. Lee**, chief research metallurgist, Bunker Hill; **Dr. M. D. Thomas**, research chemist, American Smelting and Refining Company, Salt Lake City; **Harry W. Marsh**, secretary, Idaho Mining Association, Boise; and **Lee Patchen**, plant engineer, Spokane-Portland Cement Company, Spokane.



Marcus Geary has been made pit foreman of the Perry iron mine at Nashwauk, Minnesota, of the Hanna Coal & Ore Corporation, and **Frank Schweiger, Jr.**, has been made pit foreman of the Mississippi mine at Keewatin by the Hanna Ore Mining Company.

Charles J. Johnston, of Seattle, Washington, treasurer and part-owner of the Goodnews Bay Mining Company in Alaska, was the Pacific Northwest industry representative of the 11-man Platinum Industry Advisory Committee meeting in Washington, D.C. The committee met with the National Production Authority.

Philip R. Bradley of San Francisco and the Bradley Mining Company, is head of the manganese committee which met in Washington with the Defense Minerals Administration recently. Members at the meeting were **L. B. Manning**, of Philipsburg, Montana, manager of the Trout Mining Division, American Machine and Metals, Inc.; **Sanford B. Knapp**, of Philipsburg, president of the Taylor-Knapp Company; **John Cole**, Butte president of the Domestic Manganese & Development Company; **F. A. Linforth**, Butte, assistant to the vice president of the Anaconda Copper Mining Company; and others.

Professor Edward W. Davis has been granted a one-year leave of absence from his duties as director of the University of Minnesota experiment station. He will direct the designing and building of

the experimental taconite processing plant at Babbitt, Minnesota, for the Reserve Mining Company. Mr. Davis and associates have worked out a method of crushing and beneficiating taconite at the University experiment station with a pilot plant of 25 tons per day capacity. If the plant now being planned (which Mr. Davis says, will be ready for operation by next fall) is successful, a much larger plant will be built at Beaver Bay. **H. H. Wade**, assistant director at the experiment station, will be acting director during Mr. Davis' absence.

James Walker is now employed as engineer for the Jessie H. Mining Company at its openpit stripping operation near Grand Rapids, Minnesota.

Fred Wise, manager of the Idarado Mining Company, Ouray, Colorado, has been appointed a director of the New Park Mining Company, succeeding **James L. Wade**, resigned. Wise is also general manager of the Resurrection mine. Newmont Mining Corporation has interests in all the above-named companies and Wise also works closely with Newmont.

OBITUARIES

August Grunert, consulting mining engineer of Butte, Montana, died there February 4. He had graduated from Montana School of Mines, had been president of the Western Iron Works at Butte for many years and was a member of the AIME, Mining Association of Montana and numerous other societies.

Richard C. Badger, 44, stock broker and mining operator, died in March at his home at Salt Lake City, Utah. He was president of Richard C. Badger and Company, executive vice president of Park City Consolidated Mines Company, and was connected with several other mining companies.

C. Arthur Johnson, 60, superintendent of production, Crusher Division, Nordberg Manufacturing Company, Milwaukee, Wisconsin, died February 18 while on a visit to Texas.

William Howard, 65, died last fall at his home near the Hidden Hand mine, east of Deer Lodge, Montana. He owned and operated the Hidden Hand mine and his wife expects to continue to keep her interest in it.

Armistead Grady, 65, retired chief of Oliver Iron Mining Company's service department, died at Duluth, Minnesota, on February 14.

Brent N. Richard, 66, retired ore purchasing manager of the American Smelting and Refining Company, died at Tucson, Arizona, March 8. He joined American Smelting in 1905 in Mexico and retired in 1950. He was a director of the AIME and active in numerous other organizations.

Chester E. Wright, 41, one of seven brothers engaged in uranium mining at Naturita, Colorado, was killed by a falling rock in his mine on March 30.

William Arthur Castleton, 68, mining engineer of Utah, Montana, Nevada, and lastly, Alaska, died at Seattle, Washington recently. He developed the Chicagoff, Sunset and Kougarak mines in Alaska, and was a member of the Northwest Mining Association among other organizations.

Robert Henry Ogburn, 66, assistant general manager for the U. S. Smelting, Refining and Mining Company of Fairbanks, Alaska, died at Mesa, Arizona, February 28.



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blocks on heavy-duty chains.

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For added efficiency, use Pacific Slushmaster Scrapers,
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Crushers and Pacific Wearing Parts.

Announcing the newest addition to the growing
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Shroud Sheave Blocks are available in 8", 10" and 12"
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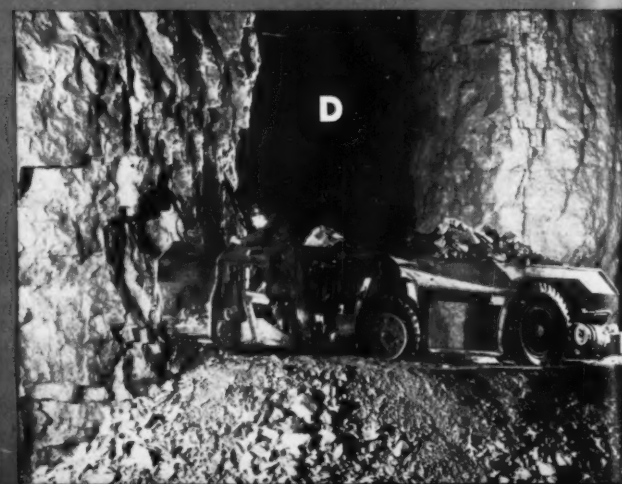
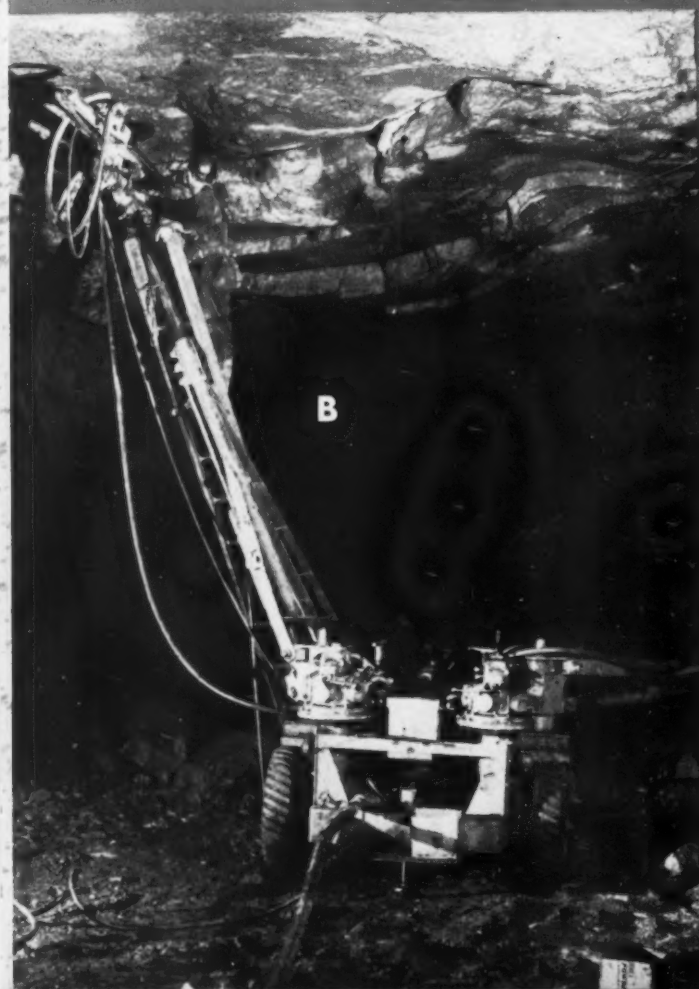
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MAY, 1951

[World Mining Section—1]



JOY



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... does the **DRILLING, LOADING** and **HAULING JOBS** with **TOP EFFICIENCY**

JOY DRILLMOBILES

In photograph B on the facing page, the long reach of a JOY Drillmobile is being utilized in taking down back. These rubber-tired, self-propelled, twin-boom units are setting new standards of fast, low-cost drilling in modern trackless mining, both in the metal and non-metallic fields. JOY Drillmobiles are fast-tramming, highly maneuverable machines, available in three sizes for work in any size heading or in stopes where the grade is not too steep. Drills can be equipped with long feed or standard drifter cradles and are mounted on JOY Hydro Drill Jibs, which make hole-positioning easy and accurate, and permit remote control for maximum safety. ● Write for Bulletin 87-F.

JOY 18-HR-2 LOADERS

Photograph A at the top of the page at left shows a JOY high capacity, continuous-type Hard Rock Loader in operation, loading into a JOY Shuttle Car in one of the mines of the Southeast Missouri Lead Belt. This heavy-duty, crawler-mounted machine loads up to 12 tons per minute, producing high tonnage at low cost in trackless mining. It is ruggedly built to handle hard and abrasive rock and ores. The JOY gathering mechanism (not shown in the picture) assures top efficiency, and the chain conveyor swings 45° to either side of center to meet various loading requirements. A smaller model, the JOY 17-HR Loader, is built for use in more restricted areas. ● Write for Bulletin J-108.

JOY SHUTTLE CARS

The versatility and flexibility of JOY Shuttle Cars in metal and non-metallic trackless mines is well illustrated by the photographs on the opposite page. In photos A and C, JOY Model 60 Shuttle Cars are shown being loaded by a JOY Hard Rock Loader and a scraper, respectively; and in photograph D, a car is shown making fill. JOY Model 60 Shuttle Cars (up to 14 tons capacity) are designed to give you rapid and low-cost transferring of rock and ore from loading points to main haulage systems. They are ruggedly-built, fast-tramming cars, with conveyor bottoms to speed loading and unloading and are available with hydraulic cable reel, trolley or diesel drive to suit operating conditions. ● Write for Bulletin J-200.

JOY SLUSHERS

In photograph C on the facing page, a JOY electric motor-operated three-drum Slusher is shown mounted over a scraper ramp, which in turn is mounted on a JOY Drillmobile chassis for easy maneuverability in a Southeast Missouri mine. JOY Slushers are available in a full range of two and three-drum models, including air or electric-powered types, adaptable for automatic or remote control if desired and built for heavy duty with low maintenance. Allied JOY equipment includes a complete line of air, electric or gasoline engine-powered single-drum Hoists, Air Motors and Winches, Carpullers and Ropepullers, Sheave Blocks and Scrapers. ● Write for Bulletin 76-Y on JOY Slushers and Bulletin 76-X on JOY Hoists.

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"Great for says John Hodge of his 4 TOURNAPULLS

Seven miles north of Canton, Georgia, Hodge Mining Company of Cartersville is stripping heavy, ore-bearing clay with a fleet of 4 high-speed, electric-control C Tournapulls. Owner John Hodge reports, "They're great machines . . . fast and rugged." Check performance figures for yourself.

27½ yds. hourly on 15,840' cycles for each Tournapull

On typical 3-mile cycles between pit and washer, the 4 Tournapulls are averaging 110 pay yards of brown ore hourly. Haul is all uphill . . . with grades that run as high as 15% . . . yet each rubber-tired "C" carries 11 pay

yards of the heavy material per trip . . . makes 2 to 3 trips every working hour.

47½ yds. hourly on 2900' cycles for each Tournapull

On previous mining job, at Taylorsville, Georgia, 3 of Hodge's Tournapulls averaged 15 trips and 142½ pay yards of heavy laminated iron ore per hour on 2900' cycles . . . while 4 crawler-scraper rigs of 18-yd. capacity, which worked the same haul, delivered only 118 pay yards an hour. In other words, each smaller, faster Tournapull outproduced each slow-moving crawler by 67% . . . 47½ to 28½ yards an hour . . . and the 3 "C's" outproduced the 4 crawler-scrapers by 25%.

When you figure this output difference on the basis of a full season's work, the *plus* for the C Tournapulls shows a very interesting profit margin over the crawlers. Let your LeTourneau Distributor show you how this high-speed, modern equipment can increase production and lower per-yard costs on *your* jobs, too! See him or write *today* for complete facts.



Spreads load in ½ to 1 minute

Here, 100' above level of cut, Tournapull dumps clay at stockpile. Big 4-wheel air brakes permit high-speed haul back down steep grades.




HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT

Stripping."

Hauls 7920' up 15% grades

Despite sharp turns, 15% adverse grades, and rough roads, Tournapull averages 8.2 m.p.h. for 1½-mi. haul from pit to dump area.



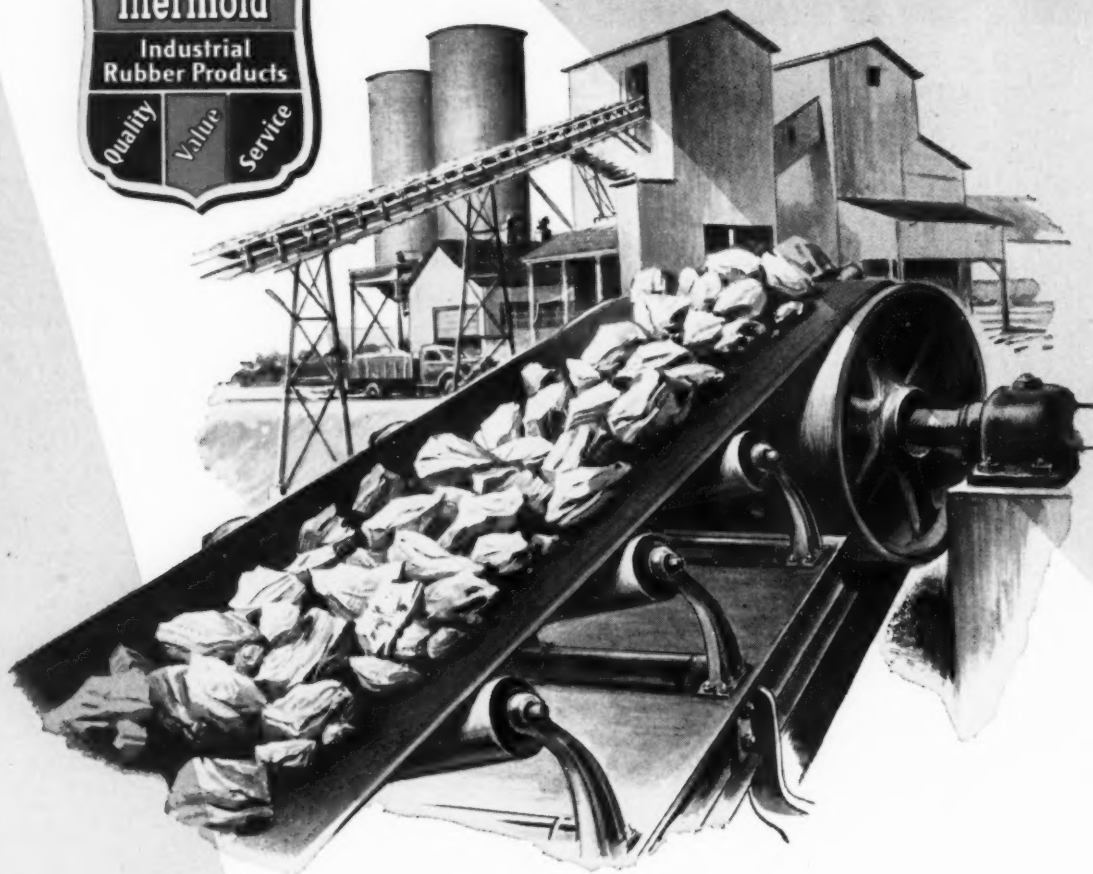
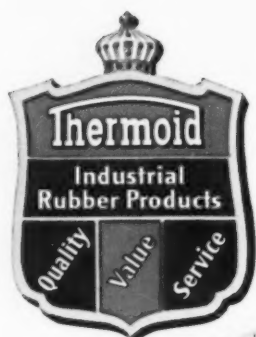
NEW . . . C Tournapulls now have 18-ton Carryall increasing capacity to 15 yards. Prime movers with Tournamatic constant-mesh transmission and torque converters are also now available, as well as the "Roadsters" with their heavy-duty, truck-type transmission. Performance figures reported here were made with earlier 13 and 13.5-yard Roadster units.

Removes 100' of clay overburden

Approximately 70% of entire stripping and ore-hauling job at this open-pit mine near Canton is being handled by Hodge's 4 C Tournapulls.



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Whatever the job—whatever the nature of the materials to be handled—heavy or light, soft or abrasive, hot or cold, wet or dry, uniform or non-uniform in size—there is a Thermoid belt built to do the job at the lowest cost per ton of material handled.

Thermoid belts are made with an extra margin of endurance. You will find they stay on the job long after ordinary belts fail. With Thermoid, you will have fewer delays due to belt breakage or premature wear. Your Thermoid distributor will be glad to help you with your requirements.

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Drop us a line for your free copy of Book No. 3679. It is a handy reference guide, concise and complete. 16 pages of valuable charts, tables and graphs tell how to select the right conveyor or elevator belt for the materials to be handled . . . how to determine capacities, speeds, weights and number of plies.

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WORLD MINING

The International Department of MINING WORLD

INTERNATIONAL PANORAMA

BOGOTA—The Colombian government-owned corporation, Empresa Siderurgica Nacional de Paz del Rio, and the French company, Delattre and Frouard, have signed a \$25,000,000 contract under which the latter will build Colombia's first steel plant.

VIENNA—The Bleiberg Bergwerks-Union has started exploration of the newly discovered zinc-lead deposits in Upper Carinthia.

WASHINGTON—Applications for export licenses for exporting certain ferroalloys and other ores and metals must now be accompanied by proof that the material proposed for export actually is available to the applicant.

LIMA—A new pig iron plant with an annual capacity of 70,000 tons will be built in Peru by a French concern at a cost of \$10,000,000.

WASHINGTON—The Reconstruction Finance Corporation, operator of the Texas City, Texas, tin smelter, is now the sole United States importer of tin.

GRAND JUNCTION, COLORADO—The United States is now the second largest producer of uranium in the world.

ROME—The Societa Monte Amiata S. A. is reopening and reequipping the Morone mercury mine after a 25 year shutdown. A group of Rome and Milan banks are financing the expansion program.

WASHINGTON—The U. S. Atomic Energy Commission has asked for wider industrial participation in zirconium production. High purity zirconium metal is needed for the nuclear reactor development program.

TORONTO—Steel production in the Dominion in 1950 was the largest for any year in history—4,255,022 net tons.

BELGRADE—The Maslinica bauxite mine in the Benkovac district has been reopened after a 20 year shutdown.

TOKYO—The Japanese government has abolished ceiling prices on pig and scrap iron, iron ore and manganese.

WASHINGTON—The National Production Authority has issued an order limiting lead use after May 1st to not more in any one month than any consumer's monthly average for the first six months of 1950. Tantalum and columbium are under complete allocation control. No firms or persons are to deliver or accept deliveries of these metals or their ferroalloys without prior authorization of NPA. Anyone selling or buying more than 200 pounds of contained molybdenum must have prior NPA authority.

PITTSBURGH—In January 1951 total shipments of steel from United States steel plants was 6,904,688 tons—the largest monthly shipments in history.

MORGANTOWN, PENNSYLVANIA—The Bethlehem Steel Company's subsidiary, Bethlehem Cub Iron Mines of Morgantown, will develop magnetic iron ore deposits discovered last year by an airborne magnetometer. The deposits are 1,500 to 3,000 feet below the surface.

BANKOK, THAILAND—The United States' Economic Cooperation Administration has given \$224,000 to Thailand for determination of the extent of antimony, lead, tin, tungsten and zinc deposits and for mining and refining ores of these minerals.

STOCKHOLM—During 1951 exports of Swedish iron ore are scheduled to reach 14,000,000 tons. West Germany, Great Britain and the United States will receive the largest shipments.

TOKYO—Contracts have been signed for the 1951 importation of 450,000 tons of iron ore from Canada, 220,000 from Mexico and 70,000 from the United States.

RIO DE JANEIRO—Brazilian and American geologists estimate that their surveys have located 33,000,000 tons of manganese ore in the Morro do Urucum area near Corumba and the Bolivian border and 7,000,000 tons in the Serra do Navio district north of the Amazon river.

ROME—The Italian Ministry of Industry is considering the centralization of uranium prospecting and mining in the government-controlled Azienda Minerali Italiani.

CAPE TOWN—The first shipment of iron ore has been made from the Postmasburg district, Northern Cape Colony, to Japan.

SAN FRANCISCO—Production of mercury in the United States in 1950 was the smallest in 100 years.

ATHENS—Manganese exploration on the Island of Samos and in the Grantitis district of the mainland will be assisted by \$119,000 in ECA funds. Two Greek firms, Siatos Typaldos (a partnership), and Dimitri Scalistriri, will supervise the work.

MEXICO CITY—The Mexican government will participate in the development of a privately owned sulphur mine at Huexcamal, San Luis Potosi State.

MULBERRY, FLORIDA—The International Minerals & Chemical Corporation will build a new \$10,000,000 phosphate chemical plant which will recover by-product uranium.

CANBERRA—The Australian Commonwealth Department of the Interior is supervising the development of uranium deposits in the Northern Territory. Work has started at Alice Springs and Rum Jungle.

LONDON—The British Ministry of Supply has advanced its selling price for copper to 26¼ cents per pound, for lead to 20 cents per pound and zinc to 20 cents per pound.

SANTIAGO—The Chilean government has proposed, to the United States, a three-point program for increasing copper output to 500,000 tons per year. Under the plan the United States would facilitate acquisition of machinery, the price for Chilean copper would be raised to 27 or 28 cents per pound, and Chile would have the right to sell 20,000 to 40,000 tons of copper annually outside the United States.

Canadian Tungsten Mine Being Re-opened

The Emerald tungsten mine at Salmo, British Columbia, is being re-opened to supply the vitally needed metal for United States defense requirements, since the Korean war has shut off supplies from China. The Canadian government has taken over the property from Placer Development, Ltd., headed by Charles Banks, and will finance construction of a new mill, which will be installed and operated on a cost-plus basis by Canadian Exploration, Ltd., a Placer Development subsidiary.

The Emerald will be the first tungsten producer in Canada to re-open and it will be a major supplier not only to the United States but to Canada and the United Kingdom.

The Canadian government is paying \$328,000 cash for the remaining tungsten ore reserves in the area which was originally developed during World War II by the government's metal mining corporation. The property originally had been owned by Iron Mountain Mining Company of San Francisco, California.

American Smelting Has Its Best Year in 1950

The American Smelting & Refining Company reports from New York that its 1950 net income was the highest on record, or \$42,718,832, compared with \$25,106,777 in 1949. The company receives income from properties it owns, or has an interest in, in Mexico, Peru, Canada, Africa, Australia, and the United States.

In Mexico, exploration of the Nuestra Senora lead-zinc property in Sinaloa has been successful, and installation of a mine plant, concentrator and townsite will start this year. The company also bought the Rosario lead-zinc-silver property at El Rosario, Sinaloa, and it may be put on an operating basis in two or three years.

In Peru, a churn and diamond drilling program is showing favorable results at the Toquepala copper mine, and another drilling program has been completed at the Quellaveco mine. Operation of one or the other is planned eventually.

In Newfoundland, further orebodies have been found by diamond drilling by the Buchans Mining Company. In Southern Nigeria, Africa, a lead-zinc operation very likely will be started—exploration is under way on holdings of the Mines Development Syndicate (West Africa) Ltd. In Western Australia, the Anglo-Westralian Mining Pty., Ltd., has bought the Protheroe lead mine, where mining started in December, and is installing equipment at the Horseshoe gold mine, which will begin operating this quarter.

In the United States, in Idaho, a lease and profit-sharing agreement was arranged with the Vulcan Silver-Lead Corporation, at whose mine a 3,000 foot vertical shaft has been completed. Development to date on that level has been encouraging.



The new Yellow Pine Antimony Smelter is a big modern installation in the rugged timbered country of Idaho's heartland. From left to right, the bag house, cooling towers, reagent storage bins, and behind the bins, the smelter building proper. The small building on the right is the two-room smelter superintendent's office.

YELLOW PINE ANTIMONY SMELTER

At Bradley Mining Company's new electric smelter at Yellow Pine, Idaho, a six-step process produces Sb_2O_3 , and recovers Au, Ag, Cu and Pb

If you should ever travel north from Boise, Idaho, and turn right just beyond Cascade, you'd be going into one of the truly primitive and beautiful areas of the United States. You'd also be on the road to Bradley Mining Company's new Yellow Pine antimony smelter at Stibnite, Idaho. There, 110 airline miles north-northeast of Boise, Bradley's Yellow Pine mine produces more than 90 percent (by metal content) of domestically mined antimony; and the new smelter produces antimony metal and oxide for United States' industries.

Designed to produce annually approximately 5,000 contained tons of antimony metal, and costing approximately \$2,500,000, the new smelter

went into operation in September of 1949.

The decision to build a smelter was based on several factors: Existing smelters were not designed to recover both the gold-silver and antimony values in Yellow Pine concentrates; and meeting the specifications of existing smelters was not conducive to good antimony recovery in the Yellow Pine concentrator. Another large factor was the costly haul of concentrates to any established smelter.

Flexible Mining—Au or Sb

The Yellow Pine openpit mine lies along a narrow north-south canyon. The orebody is divided into two pits: the east pit, which produces

ore that is valued mainly for gold that is associated with arsenopyrite; and the west pit, which produces ore that is valued mainly for antimony in the mineral stibnite. Now that antimony mining is profitable and necessary, the west pit is being mined. At another time, when production of gold is more profitable, the east pit will be mined, or both pits may be mined simultaneously.

The Yellow Pine concentrator produces a gold concentrate (typical analysis: 2.50 ounces of gold, 3.0 ounces of silver, 4.0 percent antimony, 9.0 percent arsenic, 35.0 percent sulphur per ton), and an antimony concentrate (typical analysis: 0.60 ounce of gold, 17.0 ounces of silver, 46.0 percent antimony, 1.8 percent arsenic, 22.0 percent sulphur). The 2,400-ton concentrator produces approximately 900 tons of gold concentrate and 1,100 tons of antimony concentrate each month.

By processing these concentrates, the new Yellow Pine smelter produces three products: metallic antimony; premium-grade "Elk Brand" oxide; and a "converter residue" that has a valuable gold content (contains about 250 ounces of gold per ton).

Oxide Is Wartime Flameproof

In time of peace, antimony oxide is used in the ceramic industries as a glaze, in the manufacture of paints as a pigment, as a flameproofing for fabrics, plastics, and as a base for fire-retarding paints. In time of war, the last use, flameproofing, becomes the biggest single use of ox-

John D. "Jack" Bradley, executive vice president of Bradley Mining Co., arrives by Navion plane from his home at McCall, Idaho. Jack's plane is a flying advertisement for premium-grade "Elk Brand" antimony oxide.



ide—and, to be an effective flameproof, the oxide must be of premium grade. To illustrate the effect of war on the consumption of antimony oxide as a flameproof, in 1945 the United States consumed 7,675 tons (by antimony content) of oxide for this purpose, but in 1946, with the return of peace, only 97 tons were used for flameproofing.

Metallic antimony is used largely as a strengthening agent in the hard-lead alloys for storage battery plates, type metal, antifriction bearings, ammunition, and cable shields.

Important Smelting Units

In the construction of the new smelter, these important jobs are worthy of special note:

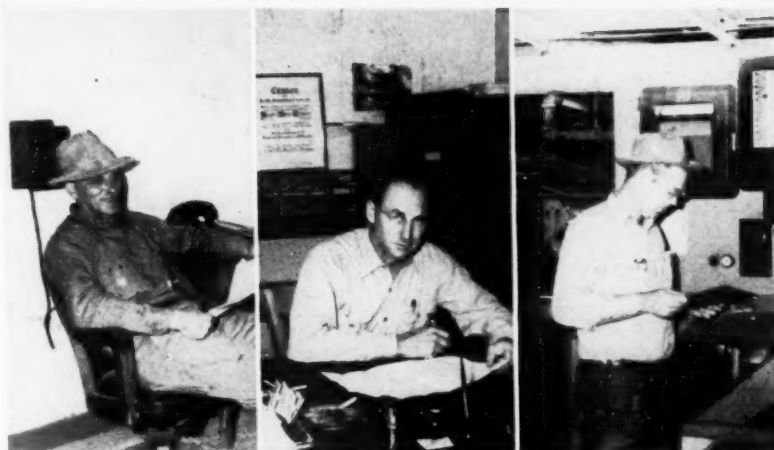
Western-Knapp Engineering Division of Western Machinery Company, San Francisco, California, was general contractor and prepared general- and detail-design plans for that phase of the work. Wemco, Western's parent company, furnished large items of equipment, including the seven cupel-type reverberatory furnaces.

Pacific Foundry Company, Ltd., Oakland, California, supplied the two large roaster units.

Independent Iron Works, Oakland, California, fabricated the all-steel smelter, roaster, and baghouse buildings, and the outside reagent-storage bins.

Pittsburgh Lectromelt Furnace Corporation, Pittsburgh, Pennsylvania, supplied the 2,000-kva electric reduction furnace.

The plant processes have been broken into six sections. These consist of the roasting plant, the mixing and blending, the electric furnace, the refining, the converting, and the reduction sections.



LEFT: Smelter superintendent Frank Souders, busy here with the bookwork, has a long history of Coeur d' Alene smelting, likes to talk about the good old days in Burke and Mullan. CENTER: Emmons E. Coleman, general manager of Bradley Mining Co.'s Stibnite operation is an electrical engineer in charge of a largely electric operation—an openpit mine, a flotation mill, and an electric smelter which use a total of 4,700 kw. of power. Just above Emmons' head is a "Citation for Health Achievement," awarded to Bradley's medical system. RIGHT: Assistant smelter superintendent A. M. "Bud" Wilson checks the roaster report for the day's operations. On the control panel in the background, instruments for control of roasting temperature and drafts are centrally located.

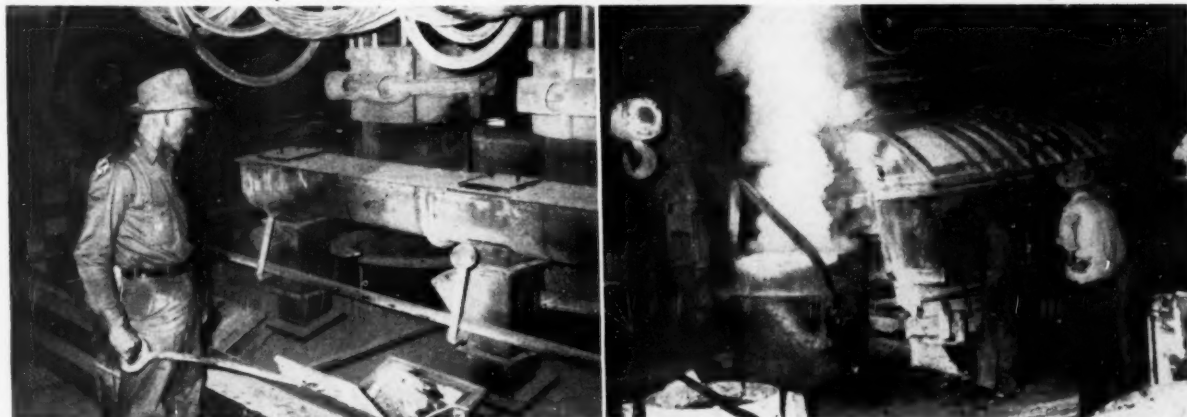
Roast to Eliminate As and S

The present practice is to dry the concentrates to 7.0 percent moisture at the mill and store them in separate bins. The daily requirements for the smelter are slushed from the bin onto a 24-inch conveyor belt that delivers to a truck on a truck scale. The truck loads are weighed, sampled, and dumped into the proper roaster bin. The antimony concentrate and the gold concentrate are roasted separately but after roasting the calcines are blended into feed for the electric furnace. The separate roasts are for the purpose of bleeding arsenic to waste from the gold concentrate. In roasting, 95 percent of the arsenic in the gold concentrate is recovered as fume in the gold bag house and is sent to stockpile.

The roasting plant has two separate systems, one treating a gold concentrate and the other an antimony concentrate; hereafter they are referred to as the gold roaster and the antimony roaster.

The gold roaster is an 8-hearth, 21½-foot Herreshoff furnace manufactured by Pacific Foundry Co., Ltd. Feed is delivered to the top hearth at 1.3 tons per hour. The concentrate is essentially self-roasting and only one small burner is fired (on hearth No. 8). The temperature gradient in the furnace is from 700° F. on No. 1 hearth to 1,350° F. on No. 7 hearth. Gas at 750° F., drawn from hearths 1, 2, 3, and 4, passes through a 12-foot hot cyclone for removal of dust. The cyclone dust is returned to hearth No. 4. From the cyclone the gas is

LEFT: Smelter superintendent Frank Souders opens an inspection port on the 2,000-kva Lectromelt furnace and inspects the charge. The Lectromelt processes all the blended charge to produce crude metal which is later refined and converted. The screw conveyor which charges the furnace is between Frank and the electrodes. RIGHT: Refiner operator Sam Ormsby tilts a refining furnace to tap a ladle full of molten antimony. Assistant smelter superintendent A. M. "Bud" Wilson talks to superintendent Frank Souders (behind Bud) on the right.



cooled in towers and passed through a Nor-Blo Automatic bag house containing 6,552 square feet of filter area. The arsenic fume collected in the bag house is stockpiled. Volume through the bag house is 14,000 cfm at 200° F; the filter ratio is thus approximately 2.40 cfm per square foot of filtering area. For filtering this highly acidic gas, Orlon bags are used which have 30 times the life of wool bags.

The gold calcine, discharged from hearth No. 8, contains 1.5 percent sulphur, is cooled and conveyed by 102 feet of Stephens-Adamson 12-inch rotary cooling conveyor, and then is elevated to the gold-calcine-storage bins inside the smelter building.

The antimony roaster is a similar 10-hearth, 21½-foot Herreshoff furnace. Concentrate is fed to the top hearth at 1.7 tons per hour. The only burner is on hearth No. 10. Temperature is very critical and must be held below 780° F. on the first five hearths or fusion will occur. From hearth No. 6 through hearth No. 9 the temperature rises to a maximum of 1,020° F. During roasting about 25 percent of the contained antimony fumes off and 75 percent remains in the calcine. Gas at 550° F. is drawn from hearths 1, 2, 3, 4, and 5 and immediately passes through a 10-foot-diameter cyclone. Cyclone dust is returned to the No. 5 hearth. The gas stream,

cooled in towers, passes through a Nor-Blo Automatic bag house containing 6,552 sq. feet of filter area. The rate of flow is approximately 16,000 cfm at 200° F. A good grade of tight wool bag gives satisfactory service and life. The collected fume is conveyed to the antimony fume storage bin in the smelter building.

The antimony calcine, discharged from the 10th hearth at 900° F., contains about 2.0 percent sulphur. It is cooled and conveyed by 102 feet of SACO 12-inch rotary conveyor, and then elevated to the antimony calcine bins in the smelter building.

Mix and Blend for Furnace

Inside the smelter building, gold calcine, antimony calcine (Sb.O.), antimony fume (Sb.O.), coal, silica, soda ash and secondaries are stored in a bank of overhead steel bins. The discharge of each bin is connected by screw conveyor to an individual Howe weigh hopper. The screw conveyors automatically fill the weigh hoppers to the weight setting on each individual hopper scale. The hoppers are discharged into a rotary paddle mixer which blends the 6,000-pound batch. Mixing capacity is 12 tons per hour. About 3.0 percent of water is added to the mixer to aid in dust control.

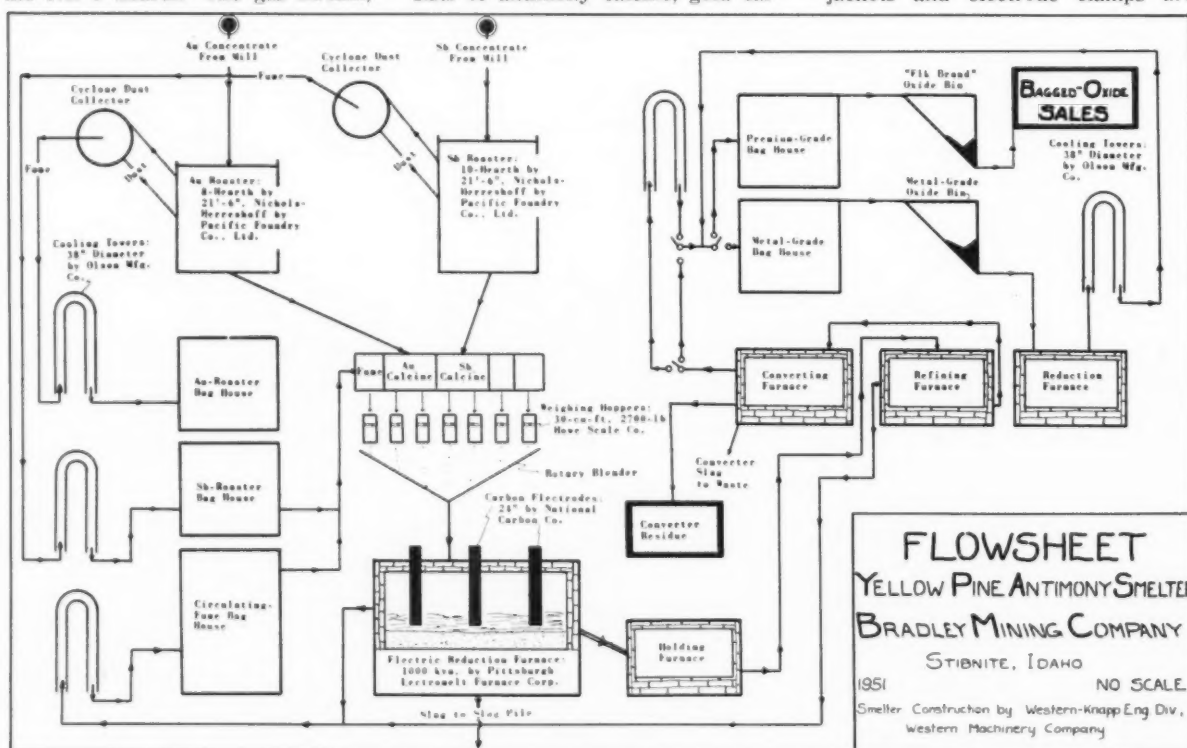
Smelt in Electric Furnace

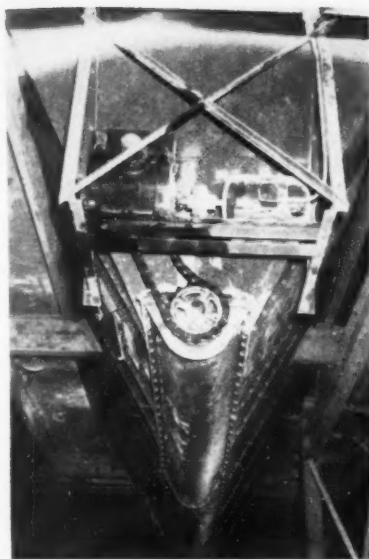
A Lectromelt furnace is the primary smelting unit. The feed consists of antimony calcine, gold cal-

cine, antimony fume, secondaries, coal, and silica for balance. The antimony in the calcine is principally tetraoxide, and the antimony in the fume is trioxide. The reduced metal acts as a collector for the gold and silver on charge.

The furnace was designed for a maximum input of 2,000 kva. It operates at 0.97 power factor. The voltage to the phases of electrodes can be varied from 80 to 130 volts; this range of voltage is satisfactory to adjust electrode penetration in the nearly sesquisilicate slag. The three electrodes, 24-inch round National carbons positioned in a straight line, are spaced 48 inches between centers. Six-foot carbon sections are added to the tops of the electrode strings when necessary. The electrodes are automatically controlled by a load-balancing system which in turn controls the depth that electrodes penetrate into the slag at any given voltage, slag temperature, and slag composition.

The furnace hearth is seven feet three inches wide by 17 feet long. It has a nine-inch invert that holds about 12 tons of metal. The invert and the side and end walls up to the slag line are lined with magnesite brick. The metal-tap hole is in the end of the furnace at the bottom of the invert. The active slag-tap hole is on the side nine inches above the top of the invert. The tapping jackets and electrode clamps are





At the bottom of each Norblo bag-house unit, a V-shaped hopper catches fume as it is shaken from the bags. The screw conveyor, at the base of the "V," carries the collected fume to storage.

water cooled. The exit gas, at 900° F., is drawn through a brick cooling chamber before entering the cooling towers and bag houses. The bag house fume is returned to the fume bin for recirculation into the furnace charge.

The operating cycle on the furnace is as follows: The furnace is fed continuously through six feed openings in the arch, three openings on each side (opposite each electrode) and about 12 inches in from the side walls. Feed originates from the blended-feed bin. The charging rate is set by the speed of the screw conveyor delivering feed to these holes. The power input is adjusted so as to approximate 360 to 380 kw per tons of charge. The optimum condition in the furnace, maintenance of three to four inches of unmelted charge floating on the slag bath, attains fast melting, low power input per ton, and no superheating of the slag and metal. Feeding and melting are continued until the top of the slag reaches 36 inches above the invert, then feeding is stopped and the furnace is allowed 30 minutes to "open up" on top. The power is cut off and the slag is tapped till the top is 12 inches above the invert. Slag temperatures range from 2,180° to 2,250° F. The slag is tapped at a rate of one ton per minute into a granulating pit. The granulated slag is pumped to a disposal area. After the slag tap, feeding is resumed, the power is turned on, and a new cycle is begun.

Metal is tapped every eight hours into a Wemco oil-fired tilting reverberatory holding furnace and is then ready to be moved on to a refiner furnace. Metal taps are made without interfering with feeding and the metal temperature is held from 1,700° to 1,800° F.

The metallurgical results obtained in the electric furnace are as follows: The metal fall averages 67 percent of the antimony in the furnace feed. Slags average 4.0 to 5.0 percent antimony, 0.02 ounce gold and 1.0 ounce silver. The electric furnace bullion averages 89 percent antimony, 5.0 percent iron, 4.0 percent arsenic, 5.0 ounces gold and 50 ounces silver per ton. The antimony lost in the slag can be greatly reduced by increasing coal in the charge, but since this increases the iron in the bullion, the loss in the slag has to be balanced against higher iron in the bullion going to the refining section.

Because the calcines from the roasting plant when mixed are on the basic side, silica must be added as a flux. The usual slag, nearly a sesquioxide, has an iron to silica ratio of 1.1 to 1.0; with this composition electrode penetration can be controlled adequately: Under best conditions, the electrodes should penetrate the slag bath from eight to 12 inches.

Refine to Eliminate Fe and As

The electric furnace bullion tapped into the holding furnace averages about 5.0 percent iron and 4.0 percent arsenic. The refining step involves the removal of these two elements to limits of 0.05 percent iron and 0.10 percent arsenic. In early practice the iron was removed by the use of sulphur and air agitation. The iron formed a surface dross and was skimmed off. In recent practice both iron and arsenic are removed by successive agitations with molten caustic.

The refining section consists of three Wemco, 5 by 7 foot, oil-fired, tilting reverberatories. Each furnace holds nine tons of metal. The metal to be refined is transferred from the holding furnace to a refiner by a Whiting five-ton tilting ladle handled by a P&H bridge crane. The refiner receives molten metal through an opening in the arch. The gas and fume from the refiners are sent to the electric furnace cooling towers and bag house.

The refining cycle consists of bringing the metal up to 1,600° F. and adding 400 pounds of flake caustic. The metal is air lanced until the

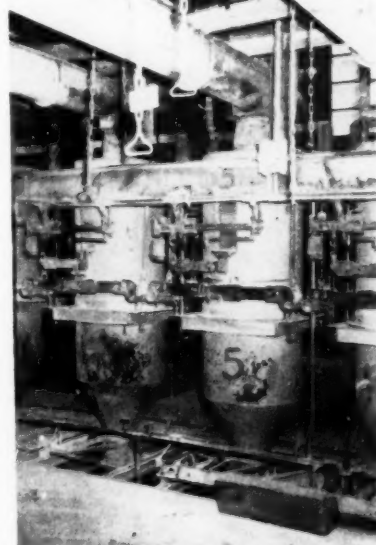
caustic sets into a pasty dross. The dross is skimmed off through the working door with wooden hoes. The cycle is then repeated until the metal assays less than 0.10 percent arsenic. By the time the arsenic is down 0.10 percent the iron is below 0.05 percent. An average of 16 hours is required to refine eight tons of metal. Experience has shown that 3.5 pounds of caustic are needed to remove 1.0 pound of arsenic. The analysis of the iron-arsenic dross is arsenic 14 percent, iron 17 percent, antimony 18 percent. The dross is water-leached and the residue, accounting for 85 percent of the contained antimony and seven percent of the arsenic, is returned to the electric-furnace charge.

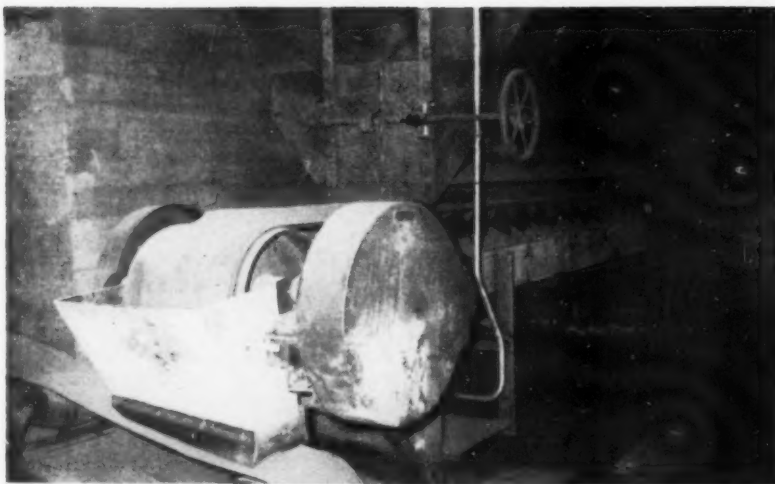
The refined metal is poured into a Whiting five-ton ladle, granulated by pouring into a stream of water crossing the top of a granulating tank six feet deep, and sent to a stockpile to be fed to the converters. The analysis of the refined metal is antimony 98.5 percent, arsenic 0.06 percent, iron 0.05 percent, copper 0.6 percent, gold 5.0 ounces, silver 50.0 ounces.

Converters Burn Sb, Leave Au

The process of converting or burning antimony metal to antimony trioxide is accomplished in two converting furnaces of Bradley design. The converters are identical in size and general build to the refining furnaces. They have four tuyeres through each side wall and the fur-

These Howe 2,700-lb. automatic weighing hoppers are fed reagents by overhead screw conveyor; an interlocking device stops feed to the hopper when the hopper contains the desired weight of reagent; the hoppers dump to a rotary blender below.





This Link-Belt 20-inch belt feeder controls the rate of flow of antimony concentrate from the smelter storage bin to the 10-hearth Pacific antimony roaster. Rate of flow is controlled by operating the handwheel to raise or lower the chute gate.

nace outlet is in the center of the arch and half-way from each end. The converters are oil fired with a burner on each end. The flue just above the arch has four adjustable openings for bleeding in quench air.

The tuyeres, made of one-inch stainless-steel pipes, fit loosely through the wall so they can be easily withdrawn for cleaning and adjustment. Low pressure air is supplied to the tuyeres at a volume which determines the capacity of the converters (top capacity of one unit is 12 tons of oxide per day).

Under operating conditions, a metal bath 10 inches deep is held in the converting furnace. The metal level is maintained by continuous Syntrol Electric Vibrator feed of granulated metal through the arch near the back wall. The bath is slagged off about every four hours. The temperature in the converters and metal bath is held at 1,650° F. The converter gas stream is quenched to 750° F. by bleeding in air at the furnace throat. This quick quench is important for control of color and quality of oxide. The gas stream is further quenched to 220° F. and sent to the premium-oxide bag house. The premium oxide is collected from the bag house and sent to a storage bin ahead of a St. Regis bagging machine. The oxide is bagged in valve-type paper bags at a rate of 20 to 24 one-hundred-pound bags per hour. Each unit of 20 bags is checked for color and each five-ton sub lot is tested for color, tinting strength, and impurities.

Average Elk Brand Antimony Oxide is superior in color to any other brands of oxide that Bradley has been able to secure for comparison.

Gold Remains as Residue

As the antimony metals burns to oxide the gold, silver, copper, and some lead concentrate in the converter bath. To regulate this concentration at about 10 to 1, 10 percent of the weight of the metal fed daily is tapped out and granulated every 24 hours, and is called primary converter residue. It averages 52.0 ounces gold, 500.0 ounces silver, 4.0 percent copper, 1.5 percent lead and 88 percent antimony. About every two weeks the metal feed is cut off and the accumulated primary residue is fed back to the converter for a so-called final burndown. After the primary residue has been recharged, the converter bath is burned down until the oxide turns to a definite yellow color. The entire bath is granulated and barreled for shipment to the United States Smelting and Refining Company. The final burndown residue averages 250 ounces gold, 2,500 ounces silver, 20 percent copper, 6 percent lead, and 68 percent antimony. Settlement schedules for residue provide payment for all these listed metals.

Reduction Only for Selling Sb

The function of the reduction section is to reduce oxide back to metal. So far the reduction section of the plant has operated intermittently. All of the plant production has been readily salable as oxide, but the off-color oxide produced during a burn-down is reduced to metal about once a month.

At present Bradley has one reduction furnace identical to the refining furnaces. Metal-grade oxide is drawn from a storage bin and mixed with three percent of soda

ash and 10 percent of coal in a split-flight screw. The mixture is fed through the arch of the furnace. Slag is skimmed off as necessary. Gas is carried to the metal-grade cooling tower and bag house section. At present the reduced metal, granulated in eight-ton batches, is all sold as granules rather than as pigs.

Yellow Pine's Future

Though the plant has reached a capacity of nearly 6,000 tons of antimony oxide per year, Bradley has a number of changes and additions underway to increase recovery and production.

In the pit, the jaw crusher will be moved this summer; the movement will liberate substantial amounts of remaining tungsten ore from the orebody that produced large quantities of tungsten during World War II. At the mouth of the pit, a gravity concentration plant will be installed to recover tungsten from glacial till; the plant will have an approximate capacity of 1,000 tons per day. In the concentrator, old mill tailing will be worked for flotation recovery of tungsten. In the smelter, an addition is under construction for the recovery of antimony and gold from the gold-roaster fume and for the production of calcium arsenite as a by-product.

Antimony Now

The metal-mining industry is the very basis of our machine-power-atomic age; without metals, we would be reduced from a first-rate industrial power to groups of itinerant herdsmen. And so it is a sad fact that many of our political and economic leaders have not realized that the metal-mining industry lives by the future—that today's production is the result of work done during the last 5, 10, or 20 years.

Yellow Pine is today an integrated chain of operations which processes ore into final metal and oxide products for consumption by industry. Today, the new smelter, the last link in the completed chain of production, is not only a plant which illustrates modern, mechanized, material handling. It is a plant and a part of an operation which should be studied by economists and politicians. They should study it to see what factors, what natural encouragements and foresight, caused the plant to be in operation today when its product is needed, rather than tomorrow when its products may have arrived "too late."

Sgt. Robert Chrisman levels a field at the eastern end of the Davison airstrip, Ft. Belvoir, Va., with a "Cat" D7 Tractor. In the background are four "Cat" No. 12 Motor Graders completing runway.



THE MILITARY GETS FIRST CALL

THESE "Caterpillar" earthmoving machines, working on the runway of the Davison airstrip at Ft. Belvoir, Va., show at a glance where a lot of "Cat" equipment is going these days. And that's how it's got to be.

Defense Rated Orders get first call as America's military establishment prepares for what may come. The urgent build-up of our power has meant drafting machines as well as men. An ever-increasing flow of "Caterpillar" equipment and parts is going to the support of America's fighting men and to defense projects.

This means that there already exists a scarcity of "Cat" equipment and engines for civilian use. So it is to *your* advantage to make the machines you

now have *last*. You can keep them on the job longer by doing these things:

- 1 Follow sound and recommended operation and maintenance procedures to the letter. Read and reread your Operator's Instruction Book.
- 2 Make full use of your "Caterpillar" dealer's facilities for servicing and rebuilding machine parts.
- 3 Anticipate future parts needs, then contact your dealer and let him help. But *don't* buy or order parts you don't actually need.

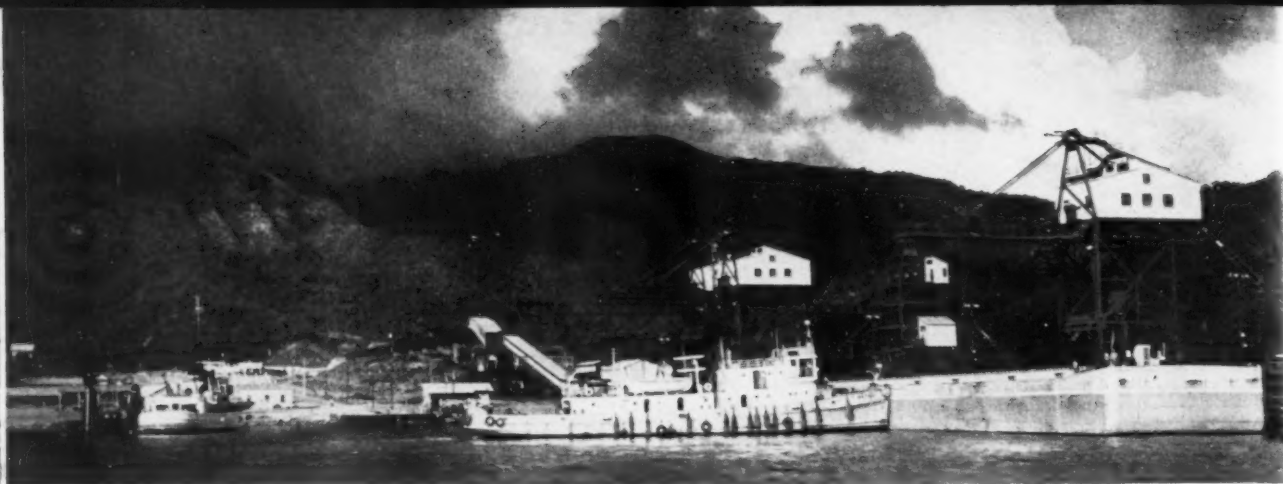
Caterpillar Tractor Co. will do everything possible to maintain every "Caterpillar" machine in the field, to provide new machines as fast as possible, and to allocate them as fairly as possible.

CATERPILLAR TRACTOR CO., San Leandro, Calif.; Peoria, Ill.

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DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT



Puerto de Hierro waterfront, with an ore barge being unloaded. At the center of the picture is the trestle on which the unloading conveyor travels ashore from the pier to the storage pocket.

AFTER 15 YEARS--EL PAO IRON

The Bethlehem Steel Company and its subsidiaries spent \$50,000,000 to bring the Venezuelan mine into production

The arrival of the S. S. Bethore with the first cargo of iron ore from Venezuela to Bethlehem Steel Company's plant at Sparrows Point, Maryland, on March 22, 1951, marked the culmination of a period of exploration and development which extended over more than 15 years. When full production is reached, the deposit of the Iron Mines Company of Venezuela at El Pao, State of Bolivar, Venezuela, is scheduled to yield about 3,000,000 tons of iron ore annually. Also, without material changes in layout and equipment, to increase the mine production to 5,000,000 tons a year is possible.

The new supply will supplement iron ore shipments from Chile and other foreign sources and will help to provide the large additional tonnage of ore needed as a result of the current 2,600,000-ton increase in Bethlehem's annual steel-making capacity. Second largest producer in the United States, the company now has an annual ingot capacity of 16,000,000 tons.

The preparatory work required in bringing the new mine into production included the construction of a river loading station and a deep-water port, and the building of a fleet of shallow-draft vessels, tugs and barges. Three new communities have been created in the wilderness, a railroad and a highway have been pushed through the jungle, and several hundred miles of river have

been sounded, charted, and marked with aids to navigation.

Discovery of the El Pao deposit is credited to a native prospector who, in 1926, found a large outcrop of rich iron ore on the summit of a hill known as El Florero. At that time El Pao was nothing but undeveloped jungle.

After some preliminary exploratory work Bethlehem Steel Company acquired the concessions in 1933 and organized the Iron Mines Company of Venezuela to develop and operate them. At first 22 concessions were acquired. Six of these were later relinquished, leaving the company with a total of 16 concessions covering an area of nearly 20,000 acres. A general survey of the property was started in 1937. This included exploration and mapping, preparation of engineering plans and general layouts for camps, shops, and a railroad and a highway between the mine and the present port of Palua on the Orinoco River.

Construction Slowed by War

Actual construction work was started in February 1941; however, lack of personnel and materials brought the work to a virtual standstill during and immediately following World War II. In February 1947, the company acquired two properties on the Gulf of Paria, known as the Valley of Jamaica and the Valley of Carenero, to be used as the site for a transfer station ap-

propriately named Puerto de Hierro, or "Iron Port." Construction here was started in May of the same year and completed in July 1950. The first major step in the building program was the establishment of a construction camp at Palua, with docking accommodations for vessels bringing in machinery and supplies, and adequate warehouse and storage facilities. A 50-ton stiff-leg derrick was erected on the river bank, for use in unloading cargo.

With the completion of a 30-mile two-lane gravel road from Palua to El Pao, early in 1944, work on the mining camp could proceed. Construction of the single-track railroad to the mine was also started at the same time, and the last spike was driven on June 1, 1950. The total length of the railroad is 38.7 miles, of which 34.8 miles is main-line track. It climbs about 1,600 ft. as it winds its way up to the mine. Of the total trackage, 21 miles is curved and super-elevated; maximum curve is 11°, United States standard, and maximum grade 2.0 percent, compensated for curvature.

Over 1,500,000 cubic yards of earth and rock had to be moved in the construction of the railroad. Two quarries with a crushing plant were opened, one at each end, to supply granite ballast for the road bed. Imported creosoted pine ties were found to be the most economical and satisfactory for service in the tropics. The track is United

States standard gage, with 100-pound rails. The main-line haulage equipment consists of three 130-ton, 1,500-hp Diesel-electric locomotives with dynamic braking; a hundred 70-ton bottom-dump ore cars; and miscellaneous flat cars, box cars, and tank cars.

One of the major maintenance problems encountered is that of keeping the jungle from encroaching upon the highway and the railroad. A gang of workers with machetes is kept constantly busy cutting down the growth. Experiments are being conducted with chemical eradicators and weed killers.

Ore—High Grade Hematite

The ore is a hard, massive hematite which will range from 63 to 66 percent iron, as shipped. It is of a type that may be used either in blast furnaces or open hearths. The main deposit now being mined is a bowl-shaped formation about 2,600 feet long and 1,700 feet wide on top of a hill rising several hundred feet above the surrounding country. The center of the bowl-like formation is filled with an overburden consisting mainly of clay, but with some igneous material; this ranges up to 425 feet in thickness and must be stripped before the orebody can be mined. The orebody itself varies from a few feet to approximately 400 feet in thickness. There are other exposed orebodies within the concessions which will be mined

later, but sufficient diamond drilling has not yet been completed to determine their size.

Openpit Mining

The mining method adopted is one of slicing off the top of the hill in 13-meter high benches by standard openpit methods. Eventually, due to the shape of the orebody, a pit will be excavated within the hill. Actual mining operations were started in August 1950 and are now being carried out on the two upper benches where the ore is exposed at the surface, with no overburden to remove. The program for the stripping of overburden will begin shortly and will progress with the mining of the various levels. Estimates indicate that 1.0 cubic yard of overburden will have to be removed for every 4.2 tons of ore mined.

Primary drilling in the ore is done with crawler-mounted, electric churn drills with 9-inch diameter bits. The upper portion of the orebody now being mined is badly fractured, a condition which, combined with the extreme hardness of the ore, presents a very difficult drilling problem.

Secondary drilling is presently being done with pneumatic wagon drills and jack hammers with "one use" and tungsten-carbide-insert detachable bits. A steel drop ball will also be used for secondary breakage where practicable. All blasting is done with 60 percent

straight gelatin dynamite detonated with instantaneous detonating fuse and electric blasting caps. Other types of explosives are being tried out to determine the type most economical and efficient under prevailing conditions.

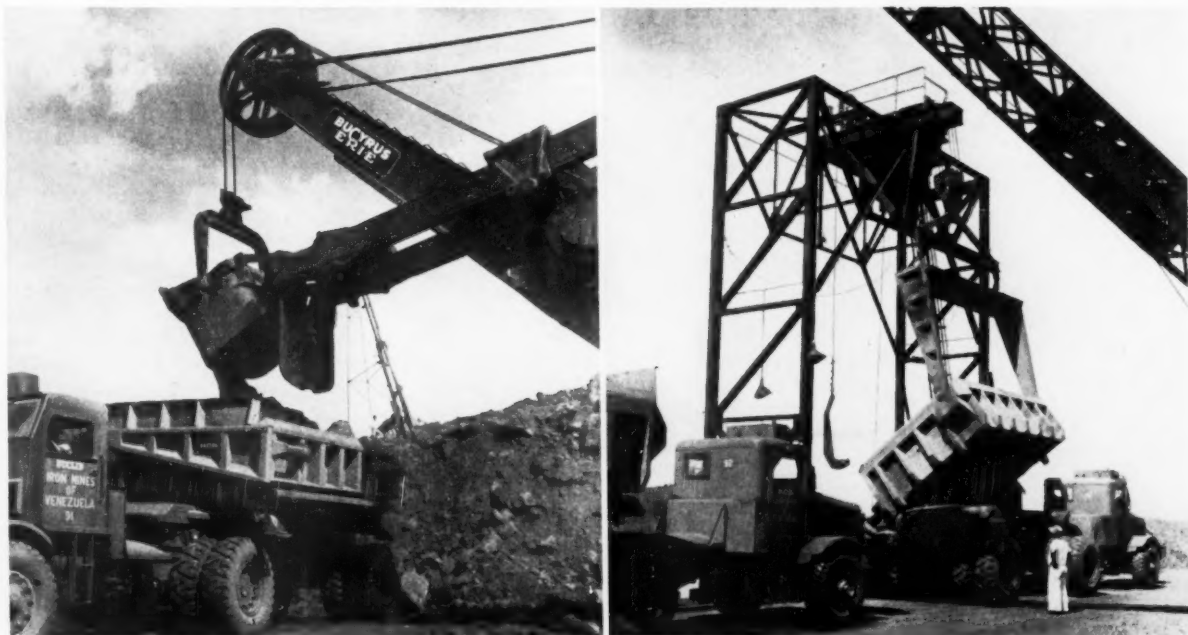
Loading and Crushing

Ore and overburden are handled by four electric shovels with four cubic yard dippers and Ward Leonard control. The ore is loaded into ten 30-ton, side-dump semi-trailers hauled by 200-hp Diesel-engine-powered tractor trucks. The heavily loaded trucks travel about one mile down an eight percent grade to the crushing plant. A special hydraulic retarding unit supplements the regular brakes on the down-hill haul. The trucks are dumped at the crusher by a fixed overhead crane which permits control of the rate of feed to the crusher.

Primary crushing is done in a 54 by 84 inch, Blake-type jaw crusher powered by a 350-hp electric motor through V-belt drive. Set at six inches the crusher has a capacity of 900 tons of ore per hour.

The jaw crusher discharges directly onto a 42-inch rubber belt conveyor, 179 feet long, running at 370 feet per minute and delivering the ore to a 23½-inch grizzly at the secondary crushers. Oversize from the grizzly flows into two, five-foot

LEFT: Loading ore with a four-cubic-yard electric shovel at the El Pao mine. Note the churn drill on the bench in the background. RIGHT: Dumping ore from a 30-ton truck into the primary jaw crusher at the El Pao mine. The crusher reduces the large boulders to 6-inch size. The secondary gyratory crushers take the ore down to furnace size, about 2½ inches.





Loading a train under an ore bin at El Pao. Gates are opened and closed with compressed air. A 33-car train is loaded in a little over half an hour.

six-inch gyratory crushers, each with a capacity of 440 tons per hour and set at $2\frac{1}{2}$ inches, or by-passes the gyratories as open-hearth lump.

Gyratory discharge and the undersize from the grizzly are combined on a 42-inch belt conveyor, 426 feet long, running at 370 feet per minute and discharging onto a $2\frac{3}{8}$ -inch grizzly on top of the ore-loading bin at the rail head. The bin, a large steel structure, has a capacity of 4,000 tons and is divided into three compartments to permit separate handling of blast furnace ore and open-hearth lump ore.

Ore is drawn from the bottom of the bin through six air-cylinder operated gates into railroad cars on a double track under the bin. A 70-ton car can be loaded in about one minute.

Normally a train is made up of 30 to 33 cars, drawn by one locomotive, with 36 cars the maximum. With an annual production of 3,000,000 tons of ore, four trains will be run from the mine to Palua every working day. Due to the steep downgrades the heavily loaded trains must travel at moderate speed, negotiating the trip to Palua in a little over two hours.

River Installation

At the river port of Palua the loaded trains are run onto a plate-girder steel trestle over a 550-foot long, 43-foot deep pocket excavated in the solid rock parallel to the Orinoco River bank. Ore from the bottom-dump cars is discharged into the pocket which has a live-storage capacity of 27,500 tons with an extra 16,500 tons dead-storage capacity.

An additional 800,000 tons of ore can be stocked under a 13-ton ore bridge which overhangs the ore pocket and operates on tracks parallel with it. The bridge has a span of 320 feet and has 146- and 95-foot cantilevers.

Underneath the storage pocket is a 660-foot reinforced concrete tunnel with twenty 4 by 4-foot air-operated chute gates in the roof, through which the ore is drawn from the pocket through three roll-type feeders and delivered to a 48-inch rubber belt conveyor, 617 feet long, which travels through the tunnel at a speed of 450 feet per minute.

To prevent surges of ore from flooding the belt the feeders are interlocked with the gate mechanism by electric relays in such a manner that it is impossible to open a gate

unless a feeder is in the correct position underneath, with the drum revolving.

The tunnel conveyor discharges the ore to a second 48-inch belt, 537 feet long, built at right angle to the ore pocket. Conveyor No. 2 travels at 450 feet per minute onto a 416 feet long steel loading structure which cantilevers out over the Orinoco River.

Directly underneath the second conveyor and parallel with it, is a 141 foot long, 48 inch wide shuttle conveyor, operating at 455 feet per minute, which discharges the ore through a telescoping steel chute directly into the vessels moored below. The conveyor has a travel of 64 feet, sufficient for proper trimming of the vessels being loaded.

Installations at Tidewater

Selection of Puerto de Hierro as terminus for the river craft was made after a thorough search along the coast for a suitable location for docking and loading the 26,000 net ton ore carriers, with adequate space for ore storage and the extensive shore installations required to maintain the port.

A flexible pier of steel construction, resting on steel H-piles, was found best suited for supporting the heavy, concentrated loads of the loading and unloading towers. The main pier structure and ramp is 785 feet long and 80 feet wide, and is supported on 239 14BP, 102-pound steel H-piles. The superstructure consists of heavy steel framing welded to the piles and a deck of continuous reinforced concrete integral with the steel framing. Thus the whole pier acts as a monolithic structure combining great strength and flexibility.

Barges and river steamers are placed end to end along the west side of the pier and unloaded by three traveling-rope unloading towers with eight-ton grab buckets. The towers, which have an average combined capacity of about 1,200 tons per hour, discharge the ore onto a 48-inch rubber belt, totaling 1,852 feet in length, in two flights, and traveling at 500 feet per minute. The conveyor leads from the pier over a trestle where the ore is discharged by a traveling-boom tripper onto a storage pile over a loading conveyor tunnel. The storage pile has 80,000 tons live capacity. An additional 1,200,000 tons may be stocked in an adjacent area under a 13-ton ore bridge with 320-foot span.

Ore is drawn from storage into a 710-foot-long concrete tunnel, simi-



Ore Carriers of the Venore class, of which the first launched was the S. S. Venore pictured here, will make a round trip ore haul from Puerto de Hierro, Venezuela, to Sparrows Point, Maryland, in 13 days. The Venore is 583 feet long, has a designed sea speed of 16 knots, and her 420,284 cubic feet of ore holds have a capacity of 24,000 gross tons.

lar to that at Palua, through 18 chute gates. Three roll feeders place the ore on a 992-foot, 48-inch belt traveling at 500 feet per minute, and discharging onto a 48-inch pier loading conveyor, 811 feet long. This passes through a traveling-boom tower which loads the ore into the holds of the ocean-going ore vessels berthed on the east side of the pier.

About 10 hours are required to load the 26,000 net-ton vessels which make the 1,950-mile journey to Sparrows Point, and back, in about 13 days.

Power and Air Supply

Electric power of El Pao, Palua and Puerto de Hierro is generated at 2,400 volts and 60 cycles in three separate Diesel-electric power stations. DC power for the ore bridge is supplied by an ignetron rectifier. Electric power for lighting and similar uses is supplied by suitable transformers.

Compressed air for the mine is produced in two 1,400 cubic-foot-per-minute, Diesel-engine-driven compressors.

Modern Housing for Employees

The problem of providing housing and other facilities for the 1,000 men and their families in completely undeveloped areas was one of major proportions. The first shelters were necessarily improvised and rather primitive. Today, however, the three communities offer adequate living quarters for all.

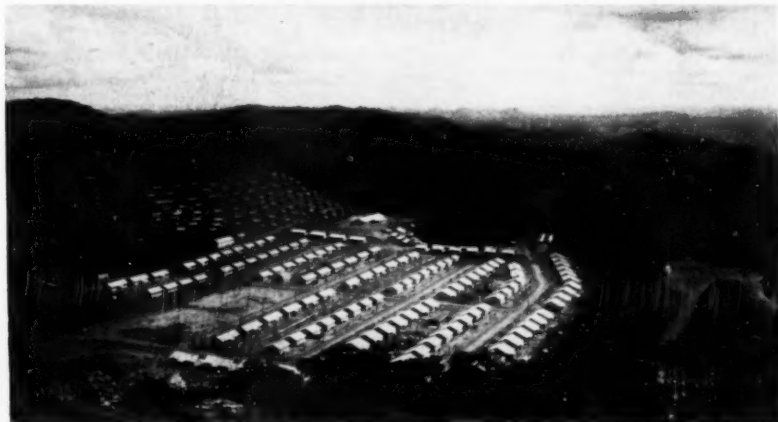
Palua, the oldest of the settlements, has already taken on the finished appearance which only comes with time. The main street is lined with full-grown trees, and yards abound in shrubbery and flowers. El Pao and Puerto de Hierro still have a new look, but efforts to make them home-like and attractive are in evidence everywhere.

Two-family houses are provided for workmen, and single dwellings for foremen, office workers and the staff. Practically all houses are one-story, of a construction adapted to the tropical climate—cool, fully screened, and termite proof. All have electric lights, modern plumbing, and sewer connection. The villages are laid out with wide, well-lighted, hard-surfaced streets.

Water of excellent quality is furnished in sufficient quantity to satisfy the needs of any community of equal size.

Attractive schools with light, cheerful classrooms and sanitary washrooms have been built in all villages. A large club house for workers, with equipment for showing motion pictures, a soda fountain, dance floor, rest rooms and other accommodations, has just been completed at Puerto de Hierro. A similar building and a municipal building are also projected for El Pao. Club houses are provided for the staff.

Workers village, El Pao. At left is the old construction camp which eventually will be torn down, and in the square below, the school house. Site for the new hospital is in the clearing at right. A new municipal building, a store, and a workers' club will be built in the open space in the left foreground.



Clean, sanitary commissaries are operated in all communities. These have walk-in refrigerated storage boxes for meat, fruit and vegetables and are well stocked with groceries, shoes, and dry goods. Space is also made available for native merchants in the villages.

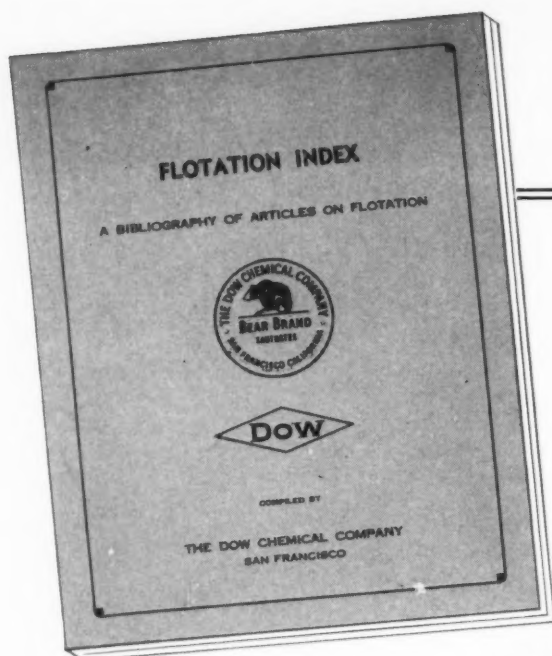
Free Medical Service

Medical service and hospitalization are free to all employees and their families. A hospital with 24 beds for the mine and river port is maintained at Palua, and a 14-bed hospital at Puerto de Hierro. Both have well-equipped operating rooms and modern X-ray and therapeutic facilities, and all types of serum and vaccines are kept on hand. Two doctors, with a staff of nurses, are in attendance at each place. A 24-bed hospital is under construction at El Pao.

In spite of the proximity to the equator, all camps enjoy a pleasant, healthful climate. The midday heat is usually tempered by gentle breezes, the humidity is low, and the nights are refreshingly cool. Use of DDT and other precautionary measures have proved very successful in combating malaria.

Communication with the outside world is mainly by airplane. The company has built an airfield at San Felix, two and one-half miles from Palua, which it maintains for daily use by commercial airlines. Puerto de Hierro has daily connection by means of company launches, free to all, with nearby Guiria and its adjoining airfield.

The pictures and data used in this article were supplied through the courtesy of the Bethlehem Steel Company.



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PROMINENT MEN IN INTERNATIONAL MINING

F. A. Meere of the Department of Trade and Customs, Canberra, was Australia's representative at the first meeting of the International Materials Conference's tungsten and molybdenum committee at Washington, D.C., in early March. The other members of the committee are as follows (each man has an alternate, not listed here): For Bolivia, **Don Juan Pona-randa**; for Brazil, **Col. Jose Filho Kahl**, chief of the Brazilian Aeronautical Commission; for Chile, **Roberto Vergara**, general manager, Pacific Steel Company, Santiago; for France, **Rene Samuel La-jeunesse**, mining engineer, Paris; for Germany, **R. Arno Ristow**, chief, Department for Ferro-Alloys, Ministry of Economics, Bonn; for Portugal, **Antonio de Lucena**, second secretary, Portuguese Embassy; for Spain, **Don Juan Lizaur**, mining engineer, Government of Spain, Madrid; for Sweden, **Olof Drakenberg**, managing director, Swedish Ferro-Alloys, Inc., Stockholm; for the United Kingdom, **V. P. Harries**, under secretary, Ministry of Supply, London; and for the United States, **J. H. Critchett**, chief, Ferro-Alloys and Metals Section, Iron and Steel Division, Department of Commerce, Washington, D.C.

F. E. Moloney has been elected president of the Chamber of Mines of Victoria, Australia. He is mining engineer for the Gold Mines of Australia.

Douglas F. Scott of Sydney, Australia, recently returned from a business trip, on behalf of Timbrol Limited, to the Congo, Northern and Southern Rhodesia, and South West Africa. He spent seven months in Africa inspecting the various mining properties.

Ivan Spens, chairman of London Tin Corporation, **C. Waite**, joint managing director of Consolidated Tin Smelters, and **T. Van der Gaast**, deputy economic secretary, Singapore, were representatives of Malayan tin interests in a discussion held at Washington, D.C., recently by countries interested in the production and allocation of tin.

Charles W. Smith of Portland, Oregon, a recent graduate of the Washington State College geology department, has left for Nigeria to take a prospecting job with the American Smelting and Refining Company. He will assist in exploring for lead and zinc deposits.

Dr. William D. Johnston, chief of the United States Geological Survey's foreign geology branch, has returned from a trip to India where he represented the U.S. and the Geological Society of America at the centenary of the Geological Survey of India, Calcutta. **John A. Strazek**, minerals geologist, and **Dr. George C. Taylor**, ground-water geologist, both with the U.S. Geological Survey, are in India working on a manganese project in Orissa.

Mark Lintz, mining and metallurgical engineer, has gone to Mexico and Central America for six weeks to do consulting and research work.

R. W. Diamond, vice president and general manager of The Consolidated Mining and Smelting Company of Canada, Ltd., has been awarded a medal by the Insti-

tute of Metals of London for outstanding services to the non-ferrous metal industries. The medal is the highest award made by the Institute.

Toshimasa Fujii, managing director of The Japan Mining Industry Association at Tokyo, Japan, is resigning at the end of his term of office and will return to the Taihei Mining Company.

W. P. Coppinger of the Washington office of the Economic Administration, **Dr. E. H. Northey**, assistant to the vice president in charge of research at the American Cyanamid Company, New York, and **S. J. Swainson**, director of American Cyanamid's Mineral Dressing Laboratory, took 38 mining executives from 14 European and African countries on a tour March 30th through the company's plants. The group, which is on a seven weeks tour of the United States, included **Giuseppe Bellavita**, vice manager of ore dressing mill plants of the Miniere di Montevicchio, Italy; **Andre N. F. Brunee**, manager of the tin ore washery of Geomines Company, Belgian Congo; **Henry F. Grondijs**, professor of mineral dressing at the University of Delft, Belgium, and consultant for the Billiton Company, Netherlands; **Eugene Gregoire**, manager of lead and zinc operations for Cie. Royale Asturienne des Mines, Paris; and **Dr. Edgar Puffe**, manager of the Mechernich Mining Works, Mechernich, Eifel, Germany.

DR. J. ROBERT VAN PELT, mining engineer and research executive of Columbus, Ohio, is Montana School of Mines' new president, succeeding the late Dr. Francis A. Thomson. Dr. Van Pelt holds an AB degree from Cornell College at Mount

Vernon, Iowa, both a BS and EM degree from the Michigan College of Mines and did graduate work at the University of Chicago in economic geology. He also holds an Sc.D. from Cornell of Iowa, conferred in 1942. He is a member of various societies including Phi Beta Kappa, Tau Beta Pi, AIME, American Association for the Advancement of Science, American Society for Engineering Education and The National Research Council. He has held jobs as a mucker, mill hand, surveyor, technical director of Chicago's Museum of Science and Industry, and, most recently, as a member of the Battelle Memorial Institute at Columbus.

Paul Jones has been elected chairman of directors of the A1 Consolidated Gold N. L., Victoria, Australia. **J. V. Lake** has retired from the position of mine manager to the company.

W. Lane has retired as mine superintendent to Cocks Eldorado Gold Dredging N. L., Eldorado, Victoria, Australia, after 14 years service with the company. He has been succeeded by **J. Foletti**, who had been dredgemaster.

Dr. Charles H. Behre, Jr., and **Park A. Hodges** of the New York firm of Behre

Dolbear & Company are in Haiti where they are engaged in professional work for that country's government.

M. J. Sayers, metallurgical engineer with The Galigher Company, Salt Lake City, Utah, U.S.A., is in French Morocco as consultant in connection with the new lead-zinc mill being opened by Newmont Mining Company at The Societe des Mines de Zelligja's property at Bou Beker. Sayers has been with the Galigher Company since 1940 and has done consulting work in South America, Mexico, Cyprus and the United States.

David Sydney Goodfellow of England has been made an inspector of machinery in the Gold Coast Mines Department, West Africa.

Norton Jackson, metallurgical engineer, has left Vatukoula, Fiji Islands, and is working in the metallurgical laboratory of the South Australian Department of Mines at Adelaide, Australia.

H. Danforth Starr has been elected to the newly created office of vice president of the Cerro de Pasco Copper Corporation of Peru and will headquarter in the company's New York offices. He had been assistant to the president.

OBITUARIES

Sam A. Lewisohn, 66, president of Miami Copper Company, died March 14 at Santa Barbara, California. He was also president of Tennessee Copper Company, South American Gold & Platinum Company, and a trustee of both the Metropolitan Museum of Art and the Museum of Modern Art.

Robert Crooks Stanley, 74, chairman of the board of directors of The International Nickel Company of Canada, Ltd., died February 12 at Staten Island, New York. At his death he was associated with many other companies and organizations and had had many honors bestowed on him by associations and industries of the world.

Lewis H. Brown, 57, president of the Johns-Manville Corporation, died February 26 at New York. He had been with the company since 1927 and was made president in 1929 at the age of 35.

Joseph Muheim, Sr., 84, Bisbee, Arizona, mining and businessman, died March 17. He was often referred to as "the grubstake founder" of Cananea, Sonora, Mexico, which became a famous copper mining center.

John J. Clifford, 55, superintendent of the Purisima Concepcion mine of Cia. Minera de Real del Monte y Pachuca, S. A., Pachuca, Hidalgo, Mexico, was killed recently in an automobile accident near Pachuca. He was from Denver, Colorado, and a graduate of the Colorado School of Mines.

Ing. Enrique Ortiz Liebich, 61, mining engineer and board member of the national Commission for Stimulation of the Mining Industry, died in Mexico, D. F. recently.

George G. Hay, president of the Yukon Consolidated Gold Corporation, died January 18 at London, England. The company has extensive properties in the Dawson area of the Yukon, Canada.



INTERNATIONAL NEWS

South African Firm Maps 5,830,000 Tons of Mn

A geological, gravity and magnetic survey has been made of the claims of the South African Mineral Corporation, Ltd. Results so far released show that on farm Otjisondu the estimated manganese ore available is 14,730 tons per foot of depth. If, as is possible, the orebodies persist to a depth of 100 feet, a total tonnage of 1,473,000 tons is indicated. On farm Ebenezer, ore available per foot of depth is estimated at 23,570 tons. The geological structure indicates that possible available tonnage to a depth of 100 feet is about 2,357,000 tons. Two of seven visible ore occurrences on farm Laburus have been mapped. The seven occurrences are estimated to have 26,000 tons per foot and with 100-foot depth about 2,000,000 tons may be available. Three other farms have yet to be mapped.

On the three farms mapped to date, total estimate of ore in the visible manganese deposits is 5,830,000 tons. About 50 percent of the ore may have to be discarded to maintain an average Mn content of 48 percent.

The deposits have reportedly been inspected by representatives of the United States Steel Corporation and arrangements are being made for the regular shipment of manganese ore to that corporation.

Mining Increasing, New Mill Planned in Formosa

In Formosa, the government has advanced \$400,000 and a loan of \$300,000 from the United States to the Kinkwashek mine for the reconstruction of its flotation plant and the resumption of copper mining. The 500-ton plant will produce copper and pyrite concentrates and will be operating, according to expectations, by this fall.

Gold production, both from the Kinkwashek mine and from several private gold mines, reached the highest production in 1950 since 1945 and showed a 40 percent increase over 1949. Formosa also put an aluminum slab mill in operation in the second quarter of the year and increased overall production of alumina and aluminum ingots.

Alaska to Award \$10,000 For Uranium Finds

The Alaska Legislature has given its approval to the awarding of a special \$10,000 bonus for the discovery of radioactive minerals in the Territory. The bonus is in addition to the recently increased United States Atomic Energy Commission award and will be made under the same terms as the latter.

The special Alaska prize is expected to result in increasing the intensity of the search for uranium, as well as attracting more prospectors to the Territory. More than likely the search will not be in vain as three areas of radio-

activity in Alaska were reported during 1950.

Uraninite was recognized in samples taken from the Hyder district in South-eastern Alaska, the Medfra district in the Kuskokwim region in South-Central Alaska, and the Haycock area on Seward Peninsula. Other areas known or suspected to contain radioactive minerals have not yet been publicized.

In the Hyder district uranium minerals were identified in dikes genetically related to the igneous rocks of the Coast Range batholith. Additional prospecting is necessary, however, before the economic and strategic value of the deposits can be ascertained.

Uranium minerals in the Medfra region were reported to occur in a lode adjacent to an area of intrusive rocks. The importance of the occurrence remains to be determined.

Placer concentrates were found to contain uranium minerals in the area north of Haycock, indicating a probable lode source in the general vicinity. Again, additional exploration is required.

According to information thus far accumulated, it has been determined that uranium occurs in the Territory in geologic setting similar to that elsewhere in the world where radioactive minerals are known to occur in mineable quantities. New, important discoveries of strategic and critical minerals, many of which are known to occur in Alaska, are expected to result from the intensified search for uranium. Additional information may be obtained from the Alaska Development Board, Box 50, Juneau, Alaska.

A Briton Reviews the Metal Price Problem

As a temporary measure, the majority of British and Commonwealth mining men welcomed the announcement that the American Government was to become sole importer of some nonferrous metals. Accusations that British and Malayan tin interests have been "gouging" American customers were strongly resented in a series of letters and statements by various leaders. What, in fact, has been happening is that the competition of American stockpile authorities and private consumers forced the price of tin, and other nonferrous metals, up to ridiculous heights. Panic buying was blamed for the dislocation of the free market mechanism and, in the present emergency, the withholding of the biggest customer immediately brought the price of tin down to a more reasonable level. Even a further fall by up to 30 percent would still leave the price high enough to yield a satisfactory return to the mines and encourage the reopening of "marginal" mines.

On a broader plane, London mining companies are concerned with the abuse from almost all official sources at the high prices of nonferrous metals. After considerable pressure, the British Gov-

ernment has agreed to take representatives of the industries to the international commodity committee meetings in Washington. R. Lewis Stubbs, director of the Zinc Development Association, has been nominated by the industry and will accompany the official delegation. He is expected to ram home British Mining Industry's view that it is no use for governments to blame high metal prices on industry. These prices are caused by excessive demand and are the fruit of inadequate governmental monetary and economic policies. The mining industry is rising manfully to the task of increasing production; it hopes the governments will rise as well to their task of dealing with unusual economic demands.

Mining Begins at Third Australian U₃O₈ Field

Mining of uranium ore has begun at the Rum Jungle field, 65 miles from Darwin in Northern Territory. Mining engineers advised that two shafts already had been sunk at the mine.

The Rum Jungle field is the third to be developed in Australia, the others being Radium Hill and Mount Pleasant in South Australia, where mining operations have been proceeding for several years.

The original discoverer has been paid a reward of \$2,240 fixed on the basis that the field would produce 25 tons of uranium oxide. Further payment of \$4,480 will be made for every additional 25 tons produced. Maximum payment for any uranium discovery in Australia is \$56,250.

In Victoria, a new uranium find has been reported in a 300-square-mile area in Gippsland, above the snowline near Mount Bogong in the old gold-mining town of Sunnyside. A gold prospector, Cecil Cooper, made the discovery last November while crushing gold ore. He picked up several grass-green mineral specimens which were found to be torbernite.

American Anglo Buys So. African Cu-Zn Claims

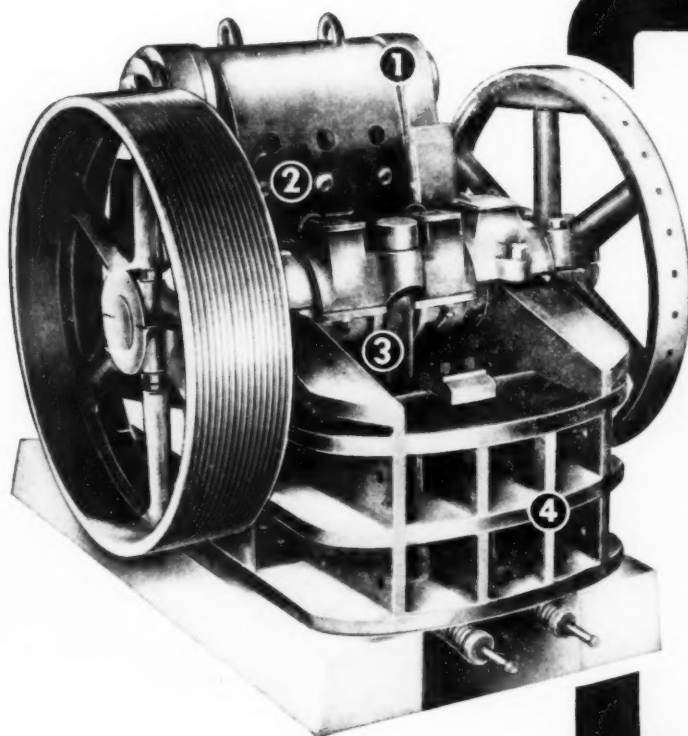
For a reported £157,000 the American Anglo-Transvaal Investment Corporation, Ltd., has exercised its option to purchase the promising copper and zinc-bearing properties, comprising 1,623 base metal claims, of the Murchison Copper and Zinc Holdings, Ltd., in the Pietersburg mining district. Murchison retains a 20 percent participation.

Through the sale, American Anglo gains control of three Murchison subsidiaries, two of which hold 5,837 base metal claims, and the third holding a prospecting license on one farm. All the claims are in the Pietersburg district.

The directorate of American Anglo, which is an associate of the Anglo-Transvaal Consolidated Investment group, in-

Continued on Page 46

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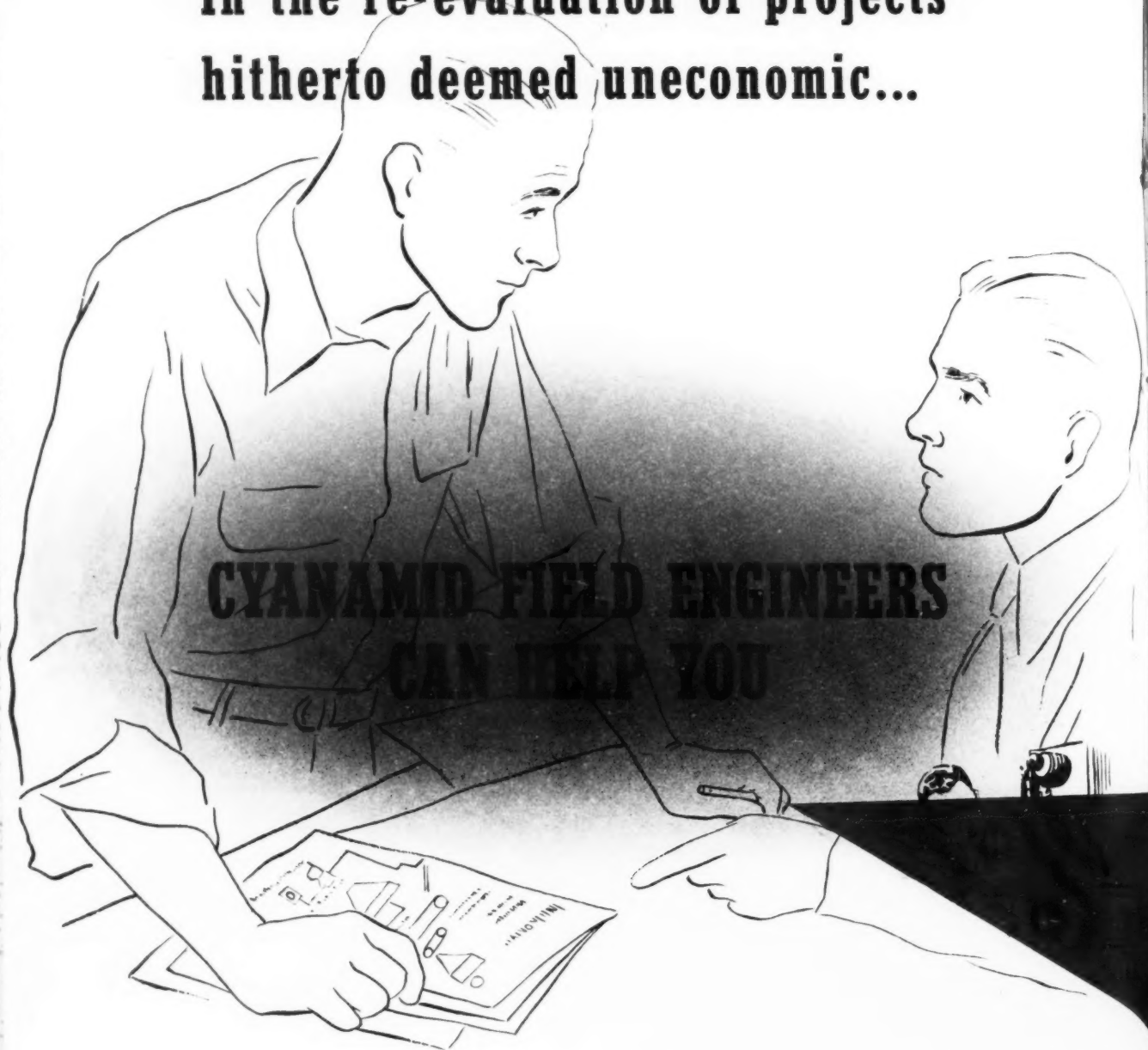
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INTERNATIONAL

Continued from Page 42

cludes L. S. Cates, H. B. Lake, and A. B. M. Meyer, all of the United States. The corporation's shareholdings, in addition to its Murchison interest, include investments in Anglo-Transvaal Consolidated, Associated Manganese Mines, Central Mining Free State Areas, Middle Wits, Stilfontein Gold Mines, Virginia Orange Free State Gold Mines and Merriespruit O. F. S. Gold Mines.

Australia and Mexico to Start Sulphur Projects

Four Australian companies plan to form a subsidiary in which they will hold equal shares, which will be capitalized at £200,000 (\$448,000) and which will develop a pyrite deposit at Nairne in South Australia for the extraction of sulphur to ensure supplies of superphosphate for South Australian farmers. The four companies are the B. H. P. Company, Ltd., Adelaide Chemical and Fertilizer Company, Ltd., Cresco Fertilizer, Ltd., and Wallaroo-Mount Lyell Fertilizers, Ltd. They plan to build a plant to cost about £800,000 (\$1,792,000), and the State government will guarantee an overdraft for the balance.

In Mexico, the Petroleos Mexicanos (Pemex), the official oil company, is completing a plant in which sulphur-bearing natural gas from its properties will be used to produce sulphur at an initial rate of 150 tons daily, and thereafter at 200 tons daily. The plant is in the Poza Rica oil fields, Vera Cruz.

About 308 sulphur deposits have been located in Mexico but only 54 are active, with the result that Mexico imports considerable sulphur for her needs. The activation of more of these fields, plus output from the above plant, could make the country self-sufficient in sulphur.

Zenda Gold Considers Tin Dredging in Alaska

The Zenda Gold Mining Company (Nevada) is considering undertaking a tin dredging operation in Alaska, and through its Canadian subsidiary, Zenda Gold Mining (Canada), Ltd., is preparing

to start drilling for oil in Alberta, according to a board of directors announcement from Los Angeles, California.

In connection with the Alaskan tin project, Zenda has under option an area located on Cape and Boulder Creeks in the Port Clarence mining district of the Seward Peninsula. The property to be dredged is about 100 miles from Nome and has been test-drilled by the U. S. Bureau of Mines.

The company proposes to erect on the property a dredge which had been intended for use on Zenda's placer gold holdings in British Columbia. Because of the inability to get necessary materials in Canada for gold mining, a decision was made to use the equipment for the recovery of tin on the Alaska property. The dredge, which is now in Alaska and will be moved down the Yukon River to the tin deposits, is a 4½-cubic-foot, continuous-bucket-line machine, all steel, with a pontoon hull.

At the meeting of the board of directors, R. T. Whiting of Seattle, Washington, was elected to fill a vacancy on the board, and Norman C. Stines, widely known mining engineer, was appointed general manager. He has had extensive experience in Alaska and Canada, and for the past year has served as consulting engineer and general manager of Zenda's Canadian subsidiary.

U.S.A. Experimenting in Recovery of Mn from Slag

A miniature blast furnace at Pittsburgh, Pennsylvania, working with slag, the waste material of steel production, may prove to be one of the most important furnaces in the country, according to the American Iron and Steel Institute. This furnace, 16 feet high, started operating early in March in an attempt to recover the manganese in slag from open hearth furnaces.

The small blast furnace is intended to simulate conditions in a commercial structure in attempts to remove undesirable, such as phosphorus, from the open hearth slag. If the theory being

tested at Pittsburgh proves practical, a useful ferroalloy containing 80 percent manganese will be produced.

Some research metallurgists believe that an estimated 440,000 tons a year of manganese may be found in this country in economically recoverable open hearth slag. That tonnage is equal to approximately 68 percent of the amount used in steel manufacturing during 1950.



YUGOSLAVIA—Various information reaching London, not all of it believed to be entirely reliable, indicates that the Yugoslavian Government is pressing on with the development of its mining industry. At present, the export of metals, mainly, for the U.S. stockpile, is almost the only way the country can earn badly needed dollars. A new lead melting plant at the Trepcja smelting works has begun operations. It has an annual capacity of 30,000 tons of crude lead and is claimed to be one of the biggest furnaces of its type in Europe. This furnace and the other plant which includes a roaster and electric filter, have raised capacity threefold to more than 100,000 tons a year. Bosnia and Hercegovina are also rich in natural resources including large deposits of iron ore and coal which are being explored and, in some cases, mined. An aluminum plant is being erected in the Neretva valley. In the mountainous areas of Bosnia, large deposits of manganese, copper and chrome are reported and, along the Adriatic coast, there are definitely known to be large deposits of high grade bauxite suitable for treatment by the Bayer method and convenient for shipment. Part of the United States grant of \$38,000,000 and the United Kingdom grant of nearly £10,000,000 is expected to be spent on mining machinery and technical services.

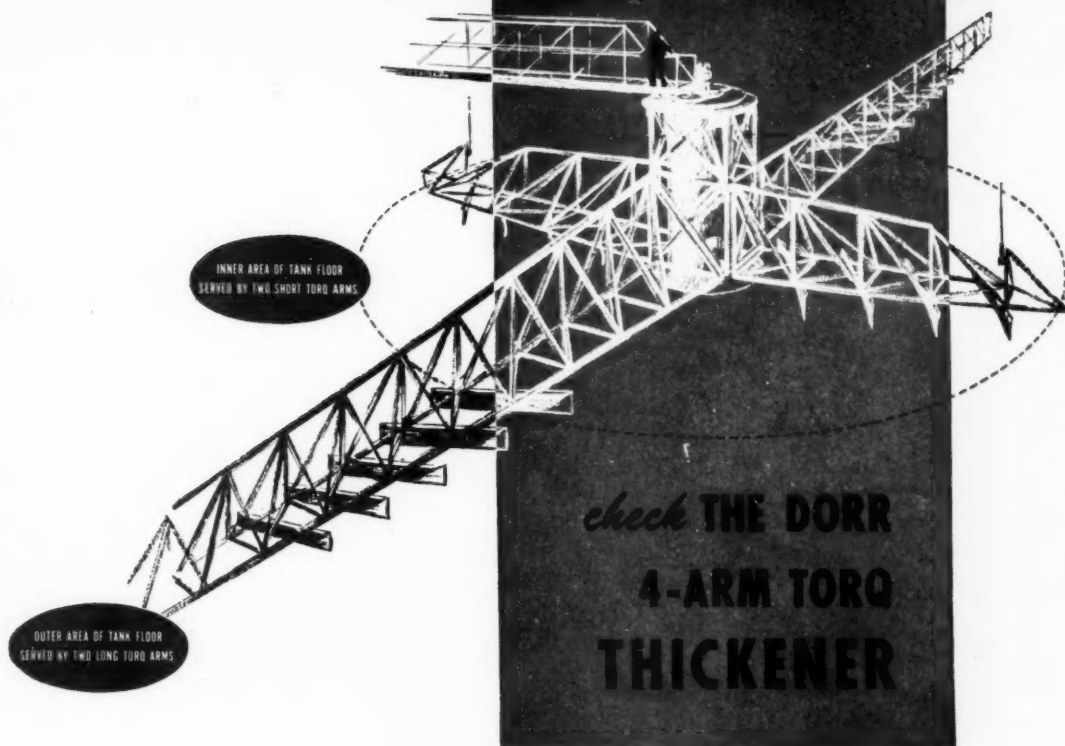
SCOTLAND—Further developments are reported in the attempted resumption of

NORWEGIAN IRON MINE PLANS 500,000-TON PRODUCTION FOR 1951



The headframe, iron ore concentration mill and the harbor works at Fosdalens Berveraktieselskap, Norway, appear in this photograph. The mine, except for A/S Sydvaranger, is the most important iron ore mine in Norway. Planned production for 1951 will be 500,000 tons of ore, yielding 250,000 tons of iron concentrate and 10,000 tons of pyrite concentrate. Thor Amdahl is the manager of the mine, and Carl W. Carstens is mine superintendent.

TACONITE TAILINGS a problem?



The heavy-duty 4-Arm Dorr Torq Thickener is a natural for the job of dewatering taconite tailings—or those of any heavy ore. Here's why . . .

Raking load is distributed between two sets of arms . . . one long and one short . . . both utilizing the self-lifting Torq principle. The long arms rake the outer section of the tank floor. The short arms take over the load in the inner section, raking the solids to a conventional center-cone discharge.

Each set of rakes functions independent of the other.

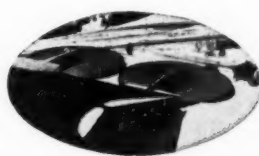
The short arms can take the heavier loads near the discharge cone in stride.

Mechanically, this means uninterrupted operation—real overload protection—and easier start-ups after enforced shutdowns.

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MAY, 1951

[World Mining Section—25]

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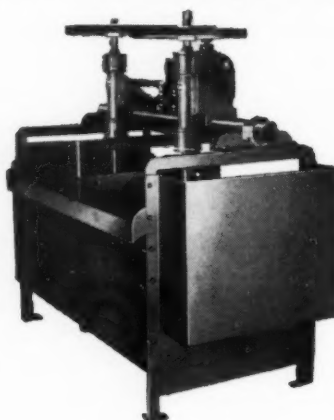
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lead mining at Leadhills, the second highest village in Scotland, where lead has been mined since the 13th century. A survey of the area has now been completed, and a leading mining company is interested in the idea of resumed working both at Leadhills and and Wanlockhead (Dumfriesshire). The completion of electrical installation in the village has brought the date of resumed working much nearer.

SWEDEN—Iron ore production during 1950 increased compared with 1949 and amounted to about 14,000,000 tons. New plants went into operation and more were planned. The Kiruna and Malmberget regions produced about 12,800,000 tons of high phosphorous iron ore. At Blotberget a new concentration plant began operating; its capacity is 250,000 tons yearly. At Persberg a magnetite plant has started production. At Bodas a pelletizing plant is being erected, and trial operation of similar plants at Mossgruvorna has already taken place. At Striberg a new HMS plant is being installed with a Hardinge separator and will begin operating in 1952 at a rate of 100 tons hourly. At Stripa, another new HMS plant is operating at 60 tons an hour. The Swedish Government's company, AB Statgruvor, which is running the Haksberg, Stollberg and Intranget mines formerly owned by the Germans, expects to increase output substantially. The Stollberg produced 3,500 tons of lead and some zinc in 1950. The Boliden Company, which produced 1,320,000 tons of lead-zinc ore in 1950, is building a new lead concentrating plant at Laisvall, the main concentrator at Boliden is being enlarged, and a new mine plant will soon be finished at the Renstrom mine.

ITALY—Further mineral discoveries recently reported include that of silver in the Iglesias zone (Sardinia). An output of 70,000 kilos of silver annually could be made for 20 years, according to estimates. To exploit the deposits the Italian Government is creating a company in Rome to be capitalized at 500,000,000 lire, which may be increased later to 5,000,000,000 lire. Quicksilver deposits have been discovered in the Bolsena Lake region and are being investigated. Uranium occurrences have been found in the Dolomite zone near Cortina d'Ampezzo, north of Venice, and will be exploited by the Società Mineraria dell'Alto Veneto of Venice. Bauxite deposits discovered in the Potenza zone of southern Italy will be taken over by an Italo-French mining company formed in Rome with a capital of 200,000,000 lire (which reportedly will be increased later to 2,000,000,000 lire). Italian mining engineers estimate a total of 30,000 tons a year can be mined for about 20 years.

NORWAY—The Norwegian Parliament will shortly consider the establishment of a mining company to develop and mine wolframite ore in Orsdalen, near Stavanger.

FRANCE—Economic Cooperation Administration funds going into the SOLLAC plants (SOLLAC is a merger of nine leading iron and steel firms) will be \$49,360,000. The remainder of the funds for SOLLAC's great expansion will be in counterpart francs—5,000,000,000.

GERMANY—The Western High Commissioners have agreed that Germany's steel industry should be reorganized into 24 companies, and that 12 of these companies should own coal mines to supply

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For more than twenty-five years this S-A heavy duty belt conveyor system has been moving crushed ore on the most economical cost-per-ton basis.

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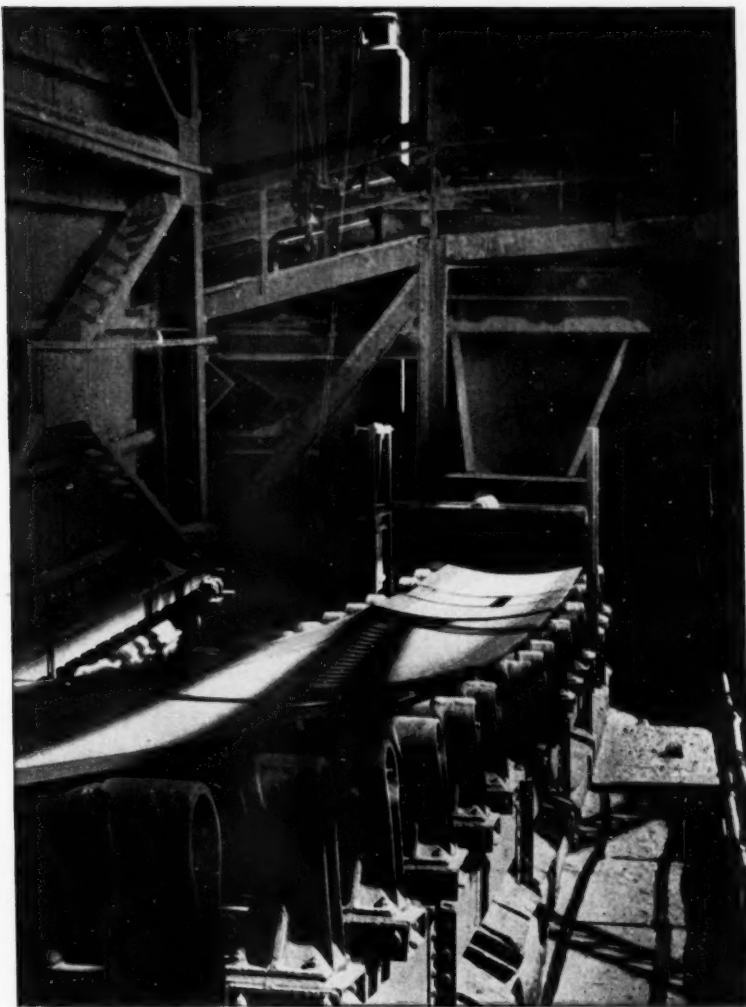
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MAY, 1951

[World Mining Section—27]



SOUTH AMERICAN COPPER MINE

Photo shows a transfer point between two 60-inch wide belt conveyors handling primary crushed ore. Belt carriers used on these conveyors are S-A "Mammoth" type weighing 950 pounds each which make them the heaviest and most rugged pieces of equipment of this type in the world. Belt conveyor in foreground moves ore in large volume up to secondary crushing plant.

INTERNATIONAL

them with up to 75 percent of their fuel.

ITALY—Iron and zinc ores have been discovered on the island of Vulcano in southern Italy and estimated output from the iron deposits is 200,000 tons yearly for 10 years and from the zinc deposits, 15,000 tons yearly for 15 years. The Ilva Iron and Steel Works has applied to the government for an exploitation permit to cover both discoveries.

SWEDEN—Prospecting since the summer of 1950 in the Vasterbotten region of northern Sweden has resulted in the discovery of deposits containing gold, silver and copper-mixed pyrites. These are the same metals found in the large Kristineberg ore field in the same area. Experimental mining will be done to prove the value of the discovery. Also, at Guliksberg, Anundsjo, northern Sweden, a newly discovered deposit, 620 meters

long and 300 meters wide, has been mapped and is said to contain silver, copper, zinc, magnetic pyrites and possibly uranium. Continued prospecting of this region is being done.



AFRICA

SOUTH AFRICA—Prospecting has been resumed in the two famous old diamond mines at Kimberley, the De Beers and the Kamfersdam, owned by De Beers Consolidated Mines. Work in the former was suspended in 1908 and in the latter in 1907, because of low diamond prices then. Prospecting is also due to

start at the company's Koffiefontein mine in the Free State, not to open up the mine but for future information.

SOUTHERN RHODESIA—Negotiations between the government and the International Monetary Fund are in progress for the sale of at least part of current gold output at premium prices. At present, the entire gold output is being sold to the Bank of England under an agreement subject to six months' notice of termination. Recently, the industry was offered a price of 291 shillings for the entire output by a leading firm of precious metal dealers, a premium of 42 shillings, 9 pence above the official price paid by the Bank of England. In 1950, exports of gold were valued at £6,500,000.

SOUTH AFRICA—One of the results of an agreement between the United States, British and South African Governments, concluded in December, is that the British Government is to provide £1,000,000 as capital for the production of uranium in South Africa. No further information has been released by officials.

SOUTHERN RHODESIA—The Sunace mine of Falcon Mines will soon begin producing tungsten. Considerable quantities of scheelite—the richest of the four ores in which tungsten occurs—have been discovered on the property and arrangements are being made for the production of concentrates. At another of the Falcon properties, Dalny mine, good progress is being made in the erection of the reduction plant which will have a nominal capacity of 12,000 tons per month. Most of the plant has been delivered and, according to E. B. Papenfus, president, the new plant will come into production early next year. Meanwhile, a small reduction plant has come into production and during December and January milled 4,500 tons, recovering 680 fine ounces of gold. This small plant is providing valuable information and experience for the working of the larger plant.

SOUTH AFRICA—The London stock markets were cheered by the latest shaft result from West Driefontein, showing that the Carbon Leader was intersected in No. 1 shaft at a depth of 3,797 feet below the collar. The exposure was complete and the 16 sections sampled averaged 110.1 dwts. per ton over a sampled width of 11.2 inches equivalent to 1,233 inch-dwts. This confirms the very rich values of the reef extending from the Blyvoor reef into the western part of West Driefontein.

FRENCH MOROCCO—French-Italian negotiations are in progress with the ultimate end in view of Italy obtaining enough iron ore for her steel industry. The main proposal is the investment of Italian capital in French North African mining concessions and the formation of an Italo-French company with a capital of 40,000,000,000 lire to operate some of the French Moroccan properties.

EGYPT—The Egyptian Ministry of Commerce and Industry may establish a 150,000-ton-per-year steel plant at an undetermined site, according to reports from Cairo. Iron ore would come from the Aswan region, and coke would be imported. The works would be operated by a limited-liability company with a capital of £15,000,000 (Egyptian), mainly subscribed by the state. Six foreign companies have submitted bids which will

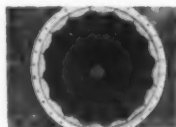
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KWH/ton	12.06/ton	11.6/ton	Grates show less ball wear

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Rear-Dump Euclids range in capacity from 10 to 34 tons and are available with standard or quarry bodies . . . semi-rigid or spring mounted drive axles . . . diesel engines from 125 to 400 h.p. Bottom-Dump models have capacities of 13 to 50 cu. yds., 20 to 40 tons, with diesel engines to 300 h.p.

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be passed on shortly. Construction of the plant would take two years.

SOUTH AFRICA—Free State Development & Investment Corporation, Ltd. ("Freddies"), one of the pioneer companies in Free State exploration and development, which sponsored the flotation of *Freddies North* and *Freddies South* mines in the immediate vicinity of Odenaalsrus, is proposing to increase the capital of the corporation from £605,000 to £1,000,000. The extra finance is required for consolidating the corporation's holdings in the *Freddies North* and *South* companies, and for continuing drilling operations in the Free State, and for purchasing the mineral rights over certain farms in the immediate vicinity of Merriespruit and Virginia mines, in the Sand or Zand River area, and in the Vaal River area south of the Western Reefs property.

NORTHERN RHODESIA—Last year the four great Northern Rhodesian mines, *Mufulira*, *Nchanga*, *Nkana* and *Roan Antelope*, produced 311,000 tons of copper, nearly one-third of the United States domestic production. Some idea of the rate of expansion can be seen by comparison with the production figures for 1946 (182,289 tons), 1948 (213,615), and 1949 (259,081). In addition, *Rhodesian Broken Hill* produced 13,945 tons of lead and 22,850 tons of zinc. Very large expansion plans for copper production were recently announced and these, together with the expansion of *Rhodesia Copper's* refinery, are expected to lead to a marked increase in production by 1953.

SOUTH AFRICA—Middle Witwatersrand (Western Areas), Ltd., has acquired the mineral rights over more than 4,500 morgen (1 morgen equivalent to about 1.44 claims) on the Klerksdorp Townlands for about £91,000. Reefs on the property belong to the Lower Witwatersrand series, and the economic horizons are understood to be the Government and Commonage Reefs, which often carry payable values. One borehole on the property disclosed values of 206 inch-dwts. The acquisition was probably made on behalf of the Middle Wits' subsidiary, *New Klerksdorp Gold Estates*, which

will probably expand its operations considerably. The property is close to the *Western Reefs* and *Stilfontein* mines.

BELGIAN CONGO—Union Minière du Haut Katanga's subsidiary, the *Société Metallurgique du Katanga*, is progressing satisfactorily with the installation of an electrolytic zinc plant and a sulphuric acid plant at Kolwezi. The zinc plant, when in operation in 1954, will have a capacity of about 36,000 tons of metal annually. The sulphuric acid plant, to begin operating at the same time, will have a capacity of 18,000 tons annually. Two reasons for building the plants were given: one, the increasing zinc content in Kipushi ore; and, second, the cost of shipping concentrates abroad for processing.

GOLD COAST—A new digging license has gone into effect in the Gold Coast and relates especially to small-scale enterprises engaged particularly in diamond mining. Nobody can carry on mining without either a regular mining license, a dredging license, or a digging license; the latter costs £5 per year whereas small miners used to get a regular license for £30. The digging license limits the area held to 25 acres, and simple monthly reports must be made to the Chief Inspector of Mines at Tarkwa, who issues the licenses.



MEXICO—Mexico is now producing enough ferro-manganese for its needs and will no longer import the \$1,000,000 worth per year it used to from the United States and Canada, according to Patricio G. Quintanilla, Mexican mining engineer. There is even a possibility that Mexico will become an exporter of manganese because of the increased output of the *Teziutlan Copper Company*. It is producing now 200-250 tons a month and will

soon raise production again to 350 tons monthly. The company also is considering production of ferrosilicon and ferrochrome.

COLOMBIA—The Callahan Zinc-Lead Company of New York has made an agreement with the owner of a mining concession in Colombia to finance an exploration project. The concession is said to have produced small amounts of high grade zinc ore. Although Callahan said that the property looked promising, no definite evaluation can be made until the project is finished.

MEXICO—Ninety Mexican companies are facing strikes under the terms of demands for revision of collective contracts filed with the Federal Arbitration Board by the national Miners Union, headed by Jesus Carrasco. The union, comprising 68 locals and 39 sub-locals, is asking wage hikes ranging from 25 to 30 percent on the premise that the companies are earning "fabulous profits" from increased production and the rise in world metals prices. The main companies affected by the strike threat are the *American Smelting and Refining Company*, *Cia. Minera de Penoles*, *Compania Fundidora de Fierro y Acero de Monterrey*, and *Altos Hornos*.

BRAZIL—The Export-Import Bank is "well along" with negotiations to provide \$30,000,000 for the production of manganese ore in western Brazil. A Brazilian corporation in which the *United States Steel Corporation* has a 49 percent interest would develop the concession. Investigations by the U. S. Geological Survey and Brazilian geologists since 1940 have shown that the largest manganese deposits in the country are the Morro do Urucum, Mato Grosso Province, orebodies containing about 33,000,000 tons and the Serra do Navio, Amapa Territory, deposits containing an estimated 7,000,000 tons.

COLOMBIA—The Chemical Construction Company, subsidiary of the *American Cyanamid Company*, is building a sulphur refining plant in Colombia, using a new process for refining low-grade ores.

MEXICO—Work at the *Moctezuma*

SINKING OF THIRD VIRGINIA ORANGE FREE STATE SHAFT STARTED



The No. 1 shaft area of the Virginia Orange Free State Gold Mining Company, Ltd., near Virginia, Orange Free State, South Africa, is shown here. Early in March the No. 1 shaft had reached a depth of 2,112 feet and the No. 2 shaft 2,014 feet. Sinking of the No. 3 shaft has been started, and the company anticipates that the sub-outcrop of the reef, at a depth of 1,450 feet, will be reached in about six months. Sinking of the Nos. 1 and 2, 24-foot, one-inch-diameter, circular, concrete-lined shafts began in October 1949. No. 1 shaft is expected to cut the Basal Reef horizon at 4,378 feet and No. 2 at 3,500 feet. These shafts are the first circular shafts to be sunk in the Orange Free State. The Anglo-Transvaal Consolidated Investment Co., Ltd., administers the Virginia company. The Kennecott Copper Corporation holds a substantial interest and is the first American company to help finance an Orange Free State gold mine.

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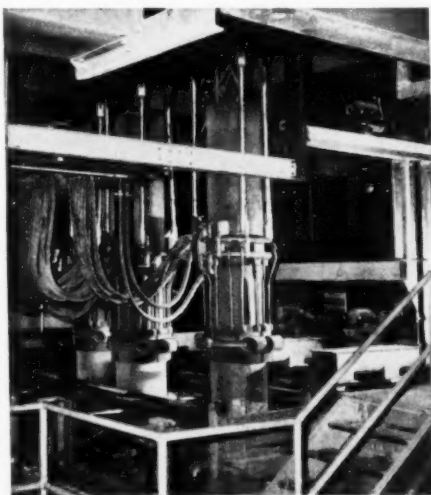
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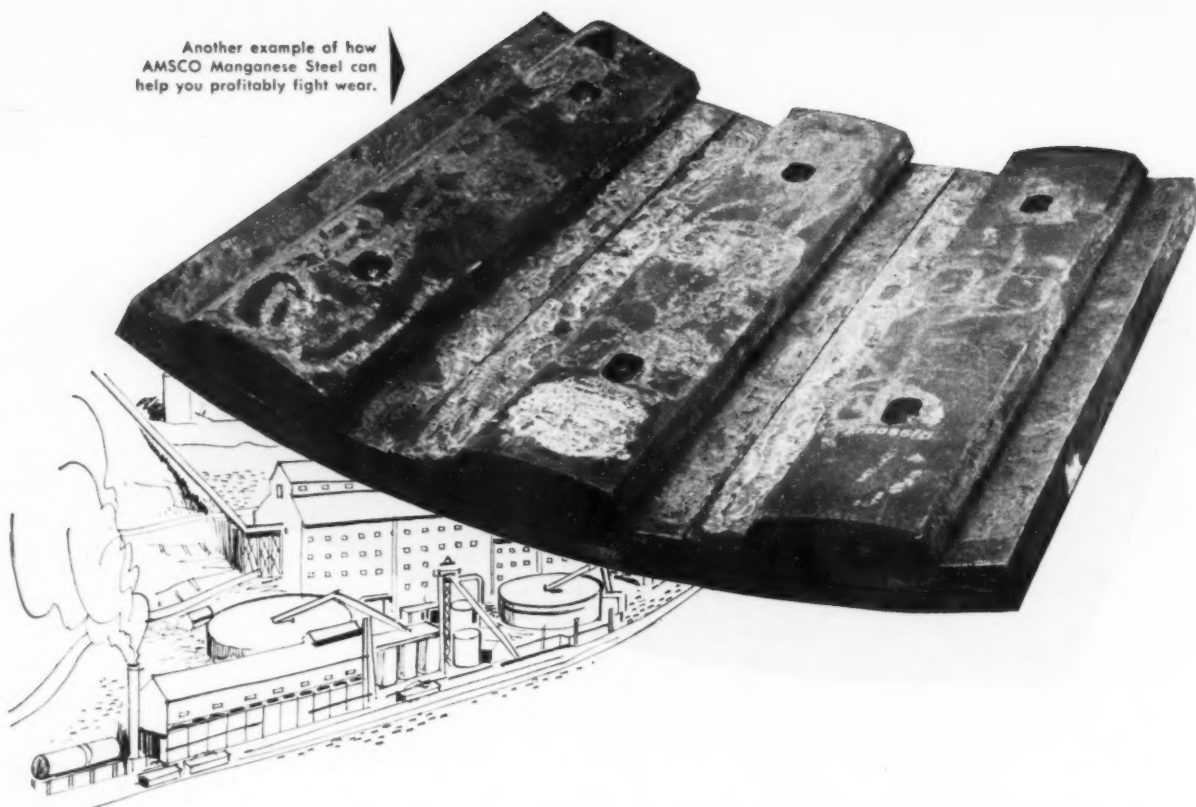
2,000-KVA Furnace at Bradley Mining Company Smelter, Stibnite, Idaho.

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1. The liners were made of AMSCO Manganese Steel, the toughest steel known for high resistance to abrasion and impact.
2. The overlapping type AMSCO Renewable Lifters took the brunt of the load—reduced the need for replacing the more expensive

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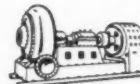
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INTERNATIONAL

Copper Company's Pilares mine at Nacozari, Sonora, during 1950 included both surface and underground installations to leach the old stope areas and mine workings. A transite pipeline was laid between Porvenir and the Nacozari precipitation plant to deliver the copper-bearing water to the plant. Leaching and precipitating operations were resumed at the last of the year. The copper produced from the precipitates was 738,231 pounds.

CHILE—The Anglo-Chilean and Lautaro Nitrate Companies have drawn up an agreement to combine operations, with Anglo Chilean acquiring the business and facilities and assuming the obligations of Lautaro. The agreement is subject to ratification by the government and stockholders.

MEXICO—Alvan Fenn of Benson, Arizona, and his brother, Moroni, are reopening the Fenn mine in the Churumbabi district of Sonora, Mexico. They expect to mill their ore at the plant being erected in the district by the Mexican government.

PERU—The Mauricio Hochschild Company is planning installation of a concentrating plant with a capacity of 500 tons a day in the San Antonio de Esquilache region and is reactivating recently acquired mines there to supply sufficient ore.

BRAZIL—A deposit of wolframite ore recently was discovered in Carneiro Branco, Brusque, State of Santa Catarina. Mining operations already have begun.

MEXICO—Alfonso Martinez Berges, Mexican mining engineer, has located two extensive uranium-bearing veins in the mountains of the State of Oaxaca and has reported the discovery to President Aleman. The prospector said the nature of his find has been fully confirmed by tests conducted with the Geiger counter but refused to give additional details. Another uranium find by Ing. Fernando Estrada is at El Guichi, a hill near Eldorado, Culiacan district, Sinaloa, where he also found vanadium. The government is investigating the deposits.

ARGENTINA—During 1950 the St. Joseph Lead Company's Aguilar mine (Cia. Minera Aguilar, S.A.) operated at 60 percent of installed mill capacity because of lack of power and adequate rail facilities, but 174,398 metric tons of ore were milled and 23,777 metric tons of lead and 24,900 metric tons of zinc concentrates were produced. Profits were about 10,961,445 pesos, nearly 2,000,000 more than in 1949. Initial operation of the new 12,000-ton per year electrothermic zinc smelter at Comodoro Rivadavia, owned by Cia. Metalurgica Austral S.A., should start soon (Aguilar owns 38 percent of this company). Lack of power has delayed the opening.

CUBA—Siscoe Gold Mines of Canada has entered a tentative agreement with the Isle of Pines Mining Company to direct operations of the latter. Sisco is considering putting up about \$250,000 to restore operations of the mill to 150 tons daily minimum. Lack of power facilities have been affecting output, but the Cuban government has promised to install a plant to meet power requirements.

MEXICO—Lead, zinc and copper production in the State of Pachuca has dropped 50 percent in six months because of the flooding of shafts, according to Andres Corral, Hidalgo mine owner and engineer. He blamed the Dos Carlos drainage cooperative's "bad economic situation." Gold and silver mining in the state has not been affected, and one lead-zinc-copper mine, the Real del Monte y Pachuca Company, boosted production from 300 to 1,000 tons daily through expansion of the flotation plant and cyaniding division. This company also has discovered new silver veins in the Pachuca and Real del Monte zones.



ONTARIO-NOVA SCOTIA—Domes Mines, Ltd., the big gold producer at

South Porcupine in northern Ontario, produced 159,904 ounces in 1950 compared with 151,519 ounces in 1949. Net income was \$1,853,074, according to Clifford W. Michel, president. The company, in order to diversify its activities, recently began a program to develop the Stirling zinc-lead-copper mine in Nova Scotia, known as the Mindamar Metals Corporation, Ltd. Both reserves and grade of ore are said to be encouraging.

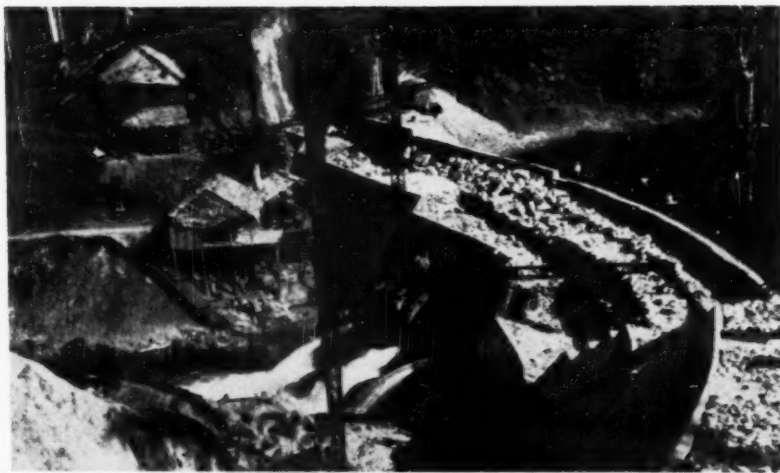
BRITISH COLUMBIA—A new company, Columbia Base Metals, Ltd., has taken over the Woolsey and Snowflake mines from Stannite Mines, Ltd., near Revelstok, and a total outlay of \$1,500,000 is contemplated with a view to 500-tons-a-day production of silver, lead and zinc. General Colin Campbell of Toronto is president, and Elmore Meredith, Vancouver, is secretary.

UNITED STATES—A new refining process has been developed which should help relieve the country's sulphur shortage. Developed by the Chemical Construction Company, a subsidiary of the American Cyanamid Company, the process recovers sulphur from low-grade ores consisting of sulphur mixed with rock. The low-grade ore is mined, ground into fine particles, then cooked with steam under pressure to force out the sulphur in fine granules, and these are separated by screening and flotation. The process yields 99.5 percent sulphur. Another development is a mining plant mounted on a steel barge developed by the Freeport Sulphur Company. A power plant to supply about 2,000,000 gallons of superheated water a day to use in the Frasch process, shops, warehouses and other facilities also are barge-mounted and floated into marsh waters to mining sites inaccessible otherwise.

BRITISH COLUMBIA—Base Metals Mining Corporation of Field is spending \$150,000 to modernize its methods and equipment, and the West Monarch property will be re-opened. The company is primarily a silver-lead-zinc producer. A new 2,400-foot exploration and develop-

LA LUZ MINES LTD. BUILDS HYDROELECTRIC POWER DAM

La Luz Mines, Ltd., has been building a new hydroelectric power dam at a point 18 miles east of the company's mine at Siuna, Nicaragua. The gravity-type structure, pictured here, will be 60 feet high and 700 feet long. It will impound 85,000 acre-feet of water which will be used at an even rate to drive the 5,400 hp of installed turbines. In 1950, La Luz used 19,816,148 kilowatt hours of electric current of which 2,789, 320 were generated by Diesels at a cost of 2.94 cents per kilowatt hour. The remaining power was generated hydroelectrically at a cost of 0.51 cents. Completion of the Mistbrook dam will lessen dependence on higher cost Diesel power. During the 12 months to September 30, 1950 the openpit mine supplied 248,015 tons of 0.095 ounce gold ore per ton and the underground production was 317,130 tons of 0.116 ounce gold ore. Operating costs were \$3.25 per ton. H. S. McGowan is general manager.



INTERNATIONAL

ment adit to become the mine's main haulage system is being driven in the Kicking Horse property.

NEW MEXICO—The *International Minerals and Chemical Corporation* set a new record for itself and possibly for the Carlsbad potash field by hoisting a daily average of 7,411 tons during February through one shaft, hoisting in counter-balance.

ONTARIO—*Kerr-Addison Gold Mines, Ltd.*, had its best year in history in 1950, milling over 1,580,000 tons of gold ore for a production valuation of \$12,211,153. The company estimated its ore reserves at 14,436,398 tons, produced 320,808 ounces of gold and 16,549 ounces of silver, and increased drift footage 85 percent during the year.

BRITISH COLUMBIA—*Selkirk Mining Company* has opened reportedly rich orebodies of lead-zinc ore at its *Jackson* mine in the Slocan district and ore shipments have been resumed. The ore is custom milled at *Kenville Gold Mine's* mill near Nelson. As a result of the new showings *Selkirk* is considering the installation of its own milling facilities.

UNITED STATES—The *Reynolds Metals Company* will raise its aluminum production by 200,000,000 pounds annually at the request of the National Security Resources Board. The company's new reduction plant at Corpus Christi, Texas, will provide 150,000,000 pounds when

completed, and additional potlines being constructed at the Jones Mills. *Arkansas* plant will complete the total. *Reynolds'* aluminum capacity will then be 650,000,000 pounds annually, and bauxite consumption will be more than 2,600,000,000 pounds a year. The company's bauxite deposits in Jamaica are being developed as fast as possible. The remainder of the ore comes from its established *Arkansas* mines.

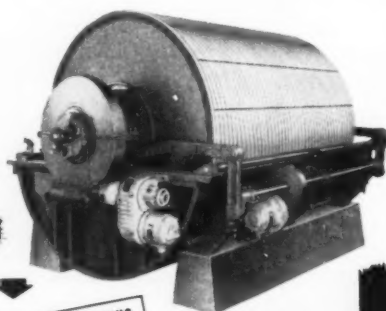
TEXAS—The *Freeport Sulphur Company* has obtained the sulphur rights on a prospect at *Nash Dome* in Texas and will begin exploratory drilling there in the near future, according to *Langbourne M. Williams, Jr.*, president. *Nash Dome*, about 35 miles southwest of *Houston*, is the sixth *Gulf Coast* salt dome at which *Freeport* is undertaking to find and develop sulphur. The prospect, known as the *Belle Wisdom* acreage, has been partially explored before but additional drilling will be necessary to determine commercial possibilities.

ALASKA—The University of Alaska is inviting bids for the building of a school of Mines building, *Dr. Terris Moore*, president, has announced. When it is completed, the University also plans to build dormitories and a student union building.

BRITISH COLUMBIA—The search for iron ore in the province is becoming intensified, partly as a result of queries from Japanese steel companies and partly

due to the increasing need for iron ore in the United States and Canada. Several companies are drilling and sampling and one company is constructing a pilot plant. Included among these firms are the *Canadian Colliers, Ltd.*, working at *Iron River* and on the west coast of *Vancouver Island*, *Ventures, Ltd.*, in the *Zeballos* area, *Quatsino Copper* at the north end of *Vancouver Island*, and the *Argonaut Company, Ltd.*, at *Quinsam Lake*, 14 miles inland from the *Campbell River*. *Argonaut Company* was incorporated in *British Columbia* by the *Utah Construction Company* of *San Francisco, California*, and is already mining ore to be run through a large pilot plant now under construction. The plant will have a capacity of 15,000 to 20,000 tons monthly. The company hopes to work out the complicated problems of beneficiation necessary for the low grade iron ores of the area. Another obstacle facing all the firms exploring in *B. C.* is the lack of dock and loading facilities which will be mandatory for any large scale shipments from the province.

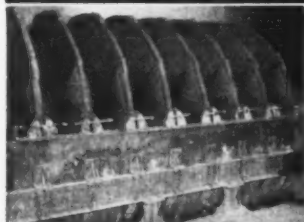
ONTARIO—A new inclined shaft, 1,650 feet in vertical depth, will be started by *McKenzie Red Lake Gold Mines* at its mine on *McKenzie Island*. Rather than sunk, the shaft will be raised from the 1,250-foot, or bottom, level by cross-cutting from each existing level and joining the crosscuts by pilot raises, later to be widened to shaft dimensions. During 1950 the company continued to open



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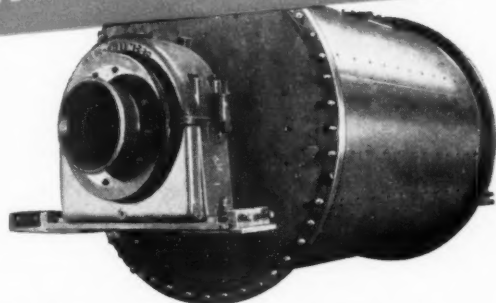
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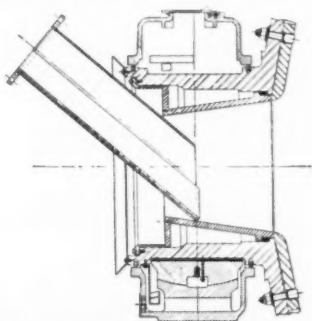
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orebodies, output was 79,677 tons for a recovery of \$918,596 and a net profit of \$215,010. A total of 26,222 feet of diamond drilling was done and 2,663 feet of raising.

QUEBEC—Because of the present demand for tungsten, *Bordulac Mines, Ltd.*, is making arrangements to reopen its gold mine in Dasserat Township west of Noranda and to work the mine primarily for scheelite originally found during shaft sinking operations in 1948. The first showing of scheelite was found at a depth of 80 feet in the shaft, occurring in a quartz-sulphur vein showing visible gold. The shaft is 150 feet deep and 1,100 feet of crosscutting and drifting from it cut another vein in which tungsten values are encouraging. T. W. MacDowell, president, announced the company's plans.

ONTARIO—At Ramsay Township, Lanark County, the newly incorporated company, *Deseco Mines, Ltd.*, acquired the Ramsay lead property consisting of 300 acres at the first of the year and since then a bulldozer has been used to strip a 100 by 800 foot area, blast holes have been drilled, and a lead concentrator with Denver type jigs and 200 tons daily capacity has been installed. Galena-calcite occurs in fissure veins in dolomite. Vice President R. Colucci advised that openpit operations will cost the company about \$1.50 per ton. The company spent \$20,000 for plant and preparatory work, and about 20,000 tons of material has been blasted from the pit and is ready for crushing.

TEXAS—Steel companies are becoming interested in the low grade Texas iron ore fields, and the most recent entry is *Armco Steel Corporation* which is said to have obtained 64,000 acres of iron-bearing property, containing an estimated 50,000,000 tons of ore, in Cherokee County. Armco also is said to have acquired the government-built blast furnace at Rusk. The corporation's subsidiary, *Sheffield Steel Corporation*, has an integrated steel mill at Houston and owns large iron properties in the Rusk region. As a result of the growing interest in Texas iron, the *Lone Star Steel Company* has advised that it is accelerating its drive to complete construction of a completely integrated steel mill costing \$73,425,201. Initial leveling and grading of the site, 30 miles north of Longview, Texas, are under way and steel for the buildings will arrive about August 1.

BRITISH COLUMBIA—*Transcontinental Resources, Ltd.*, has taken over the financing of *Crown Lead Silver Mines* on Nine-Mile Mountain northeast of Hazelton to the extent of \$180,000. An active exploration program is planned on this formerly productive silver-lead property.

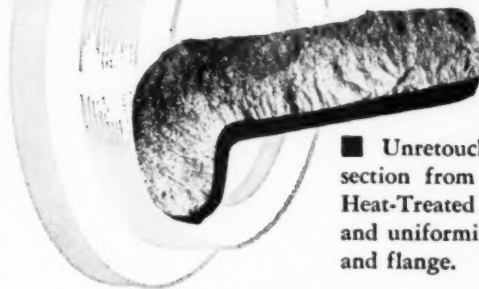
ARIZONA—In connection with the openpit mine to be developed at Bisbee, Arizona, by the *Copper Queen Branch of Phelps Dodge Corporation*, the company recently announced that included in its huge, \$25,000,000 development program would be the installation and equipment of a concentrator with a projected capacity of 12,000 tons of ore per day.

ALASKA—According to the Mukluk Telegraph, a tin mining boom is expected in the York, Tin City, and Lost River areas this summer. Evidently many old claims are being restaked and leases arranged.

NEWFOUNDLAND—*Buchans Mine* is

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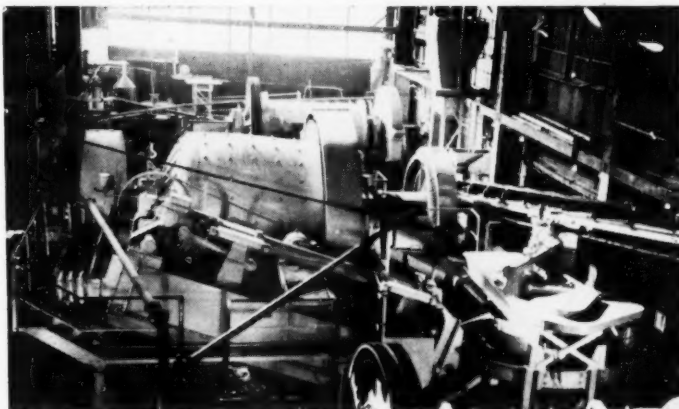


■ Unretouched photo of rim section from a card Semi-Steel Heat-Treated wheel. Note depth and uniformity of chill in tread and flange.

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{World Mining Section—37}

59



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milling about 1,000 tons of zinc-lead-gold-silver ore daily and is continuing its development program which includes sinking the Rothermer shaft to 2,500 feet and then extensive lateral work to open orebodies disclosed by a four-year diamond drilling program. Although mill capacity is at least 1,200 tons daily no attempt to increase output is planned. Development is for the purpose of continued reserves only.

BRITISH COLUMBIA—Kootenay Base Metals Limited has been incorporated by Transcontinental Resources Limited and other financial interests to develop the Kootenay King property near Estella Mines, about 12 miles from Fort Steele on the Wild Horse River. The property is an old discovery, and past development indicated about 20,000 tons of ore assaying in the vicinity of 11 percent lead, 11 percent zinc and four ounces of silver per ton. The company plans immediate further development, and mill construction is contemplated for late summer this year.



JAPAN—A consolidated development plant is being carried out by the Ishihara Industrial Company at the Myoho chalcocopyrite mine and the nearby Nachi and Kinzan mines. The last two mines were bought by Ishihara from the Dowa Mining Company and the Shouwa Mining Company, respectively. By developing

the three mines at once Ishihara will achieve greater efficiency in operation and greater output. The company now has 495,000 square meters with 30 proven veins under control. The three mines together have an estimated total of 911,134 tons of copper-sulphur ore. In 1952, the company plans to build a 300-ton mill on the Myoho property.

INDIA—The Government of India, which some months ago banned the export of all strategic ores, is said to have relaxed restrictions somewhat, with the result that the United States will be able to purchase certain minerals valuable for atomic energy projects. Shipments of beryl are expected to be sent from India to the U.S.A. shortly. A new plant for the treatment of monazite sands is nearing completion in India, and part of its output of thorium will be available also.

MALAYA—Selayang Tin Dredging reports further progress in rehabilitating its plant and machinery. A Bellis & Morcom engine, with a new high pressure Mirreles pumping unit and oil separator, together with a magnetic separator and a Holman air compressor have been purchased.

BURMA—The Burmese Government is said to be contemplating acquiring 50 percent of the shares of the Burma Corporation, which mines silver, copper and lead. The move would be made to ensure better operation of the company which has been hard hit by the last war and subsequently by the activities of insurgents.

TIBET—Although very little is known about the extent of minerals in Tibet, the country has large deposits of gold, coal and borax, and lesser quantities of iron ore, salt, oil, and uranium ore. Gold is found in numerous places, the best-known deposits being the mines at Rudok and Thok-jalung in West Tibet, worked for many centuries, and mines southeast of the Yamdok Lake and at Lit'ang. If even the barest of modern mining methods were introduced in the country, observers expect that Tibet would assume considerable importance as a gold producing country. Iron is found mainly in East Tibet in the form of pyrites and is roasted and melted locally. Borax is found chiefly in West Tibet, and at one time exports to Europe amounted to 20,000 maunds (a maund equals about 82.7 pounds) annually.

Sulphur is found in the Kongbu forests, near the lower Tsanpu.

INDIA—During last October, refined copper production totalled 603 tons, an increase over August and September (566 and 485 tons); indigenous production of lead metal totalled 93 tons, 23 tons more than in September; and aluminum production during the period of August through October totalled 324 tons, of which the Indian Aluminium Company, Ltd., accounted for 209 tons and the Aluminium Corporation of India, Ltd., 115.1 tons.

CHINA—Geological mapping completed last year at the Jin-gneu Shan auriferous pyrite deposit in Moping District, Shantung Province, resulted in the delineation of about 10 quartz and auriferous pyrite veins several hundred meters long with widths of several meters to over 10 meters. The district was worked about 300 years ago at the end of the Ming Dynasty and from 1898 on by Germans, who made some exploration drifts and crosscuts. The recent mapping resulted in estimates of several million tons of ore reserves assaying about eight grams of gold per ton.

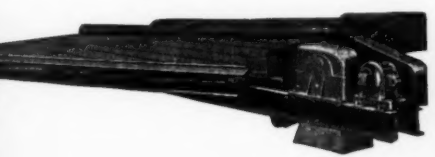
MALAYA—Tin production is threatened with a substantial reduction unless more coal can be imported. Also there is a shortage of labor adding to dredging companies' difficulties.

JAPAN—Japan is said to be planning to request from the United States about 160,000 tons of manganese ore, 20,000 tons of copper ore and small quantities of zinc, lead, nickel and cobalt. Japan has already obtained about 1,000 tons of zinc ore from Australia. Payment to the U.S.A. for any metals obtained might possibly be made through a loan, if one can be arranged, and or through Japanese exports of sulphur and tungsten.

CHINA—A gossan has been located on Chi-sha-san, one of the Nanking hills about 10 miles east of the city. One drill hole put down in the area struck galena, sphalerite and some chalcocopyrite and pyrite between 121 and 153 meters in depth. Since lead and zinc are scarce in southeastern China, considerable interest has been aroused in this deposit.

CEYLON—An invitation to United States firms to submit bids up to June 16, 1951, has been made for the construction of a complete ore-dressing plant to

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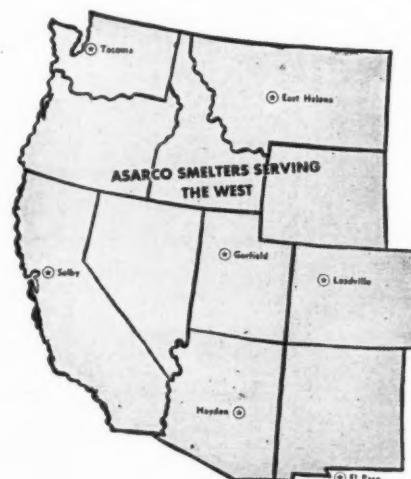
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separate beach sands at Pulmoddai. The plant is to have a capacity of 100,000 tons of raw mineral sand per year, and is to be designed to separate and produce refined ilmenite, rutile, and zircon by combined electromagnetic, electrostatic and gravity separation.

INDIA—Bauxite deposits described as extensive have been found in the hills about 15 to 20 miles north of the Korba coal fields in the Madhya Pradesh. The Tungra hill in the Thana district of Bombay also has deposits estimated to contain 100,000 tons of bauxite. No immediate mining plans are in view, however, until the large reserves in the Belgaur and Kolhapur districts are exhausted.



QUEENSLAND—Mt. Isa Mines, Ltd., is to prospect an area of 70 square miles at the tip of Cape York Peninsula, the extreme north tip of Queensland.

TASMANIA—Small parties are expected to begin working portions of the old workings of Mt. Bischoff tin mine at Waratah.

NEW GUINEA—Bulolo Gold Dredging, Ltd., for the quarter ended February 28, 1951, dredged 3,162,200 yards, recovered 20,433 fine ounces of gold, valued at \$715,505 (U. S.).

AUSTRALIA—Coal Research Pty., Ltd., is a non-profit-making, co-operative

organization which has been established jointly as a central information service and research bureau by groups of coal mining and associated companies operating in the Southern and Western Coalfields of New South Wales. The Company's Head Office in Sydney maintains contact with both home and overseas mining institutions and societies, research organizations, and similar bodies dealing with technical problems relating to coal mining, processing and utilization. At Bellambi, in the Southern Coalfield, the Company has set up and staffed a Laboratory equipped to carry out on behalf of its members the routine technical duties imposed upon them by the Coal Mine Regulation Act. In this way it assists in safeguarding the health of Members' employees and the safety of their mining installations, maintains direct contact with members collieries and works through its laboratory and field staff which investigates and gives advice about running and maintenance problems. In effect Coal Research Pty. Limited acts as a technical auxiliary of the Colliery Proprietors' Associations in the Western and Southern coalfields of New South Wales.

PHILIPPINES—La Luz Mines, Ltd., the Canadian-registered company which has been handling the Masara Consolidated Mines Corporation in the Philippines through the La Luz subsidiary, Panaminas, Inc., has decided to deal directly with Masara. Panaminas had been handling the exploration activities. According to the president of La Luz, the property shows promise and further exploration expenditures will be made.

NEW SOUTH WALES—Broken Hill South extracted 284,962 long tons of sulphide ore for the year ended June 30, 1950. Ore assayed 12.7 percent lead, 7.5 ounces silver, and 12.2 percent zinc. A total of 3,973 long tons of oxidized ore assaying 22.2 percent lead, 9.6 ounces silver, 13.6 percent zinc was mined and shipped without treatment to Broken Hill Associated Smelters, Port Pirie. Ore reserves have been conservatively estimated at 1,950,000 long tons compared with 1,970,000 long tons in the previous year. Development totalled 5,052 feet, and 1,501 feet of diamond drilling was carried out (annual report).

WESTERN AUSTRALIA—Depletion of ore reserves at Paringa Mining and Exploration Company, Ltd., compelled the company to cease milling on January 17th. A program of development, including geological surveying and diamond drilling, will be carried out. A small amount of low-grade ore from Mt. Charlotte is being treated.

NORTHERN TERRITORY—Drilling at Peko (Tennant Creek) Gold Mines N.L. has intersected, at 320 feet depth, 150 feet from the shaft, a 10-foot lode assaying 14.6 dwts. gold and 8 percent copper per ton. Additional leases are being taken up.

NEW GUINEA—Mandated Alluvials N.L. reports ore reserves at 300,000 long tons of 4 percent copper, 3 dwts. gold, 42 percent sulphur, and 1,000,000 long tons of possible ore. The Dorr Fluo-Solids roasting process is being tested on this ore.

VICTORIA—Wattle Gully Gold Mines N.L. has purchased the crushing battery,

building and equipment of Central Nell Gwynne Gold Mining Co. N.L.

WESTERN AUSTRALIA—The Sons of Gwalia treated 8,012 tons for 2,200 fine ounces of gold recently. The firm advised that the north and south drives off the east crosscut had been started. Steady values showed 6.8 dwts. and 9.4 dwts. over 96 inches each.

PHILIPPINES—For the month of February, 1951, the Atok-Big Wedge Mining Company, Inc., reports handling 13,744 tons of ore for a return of \$146,960, compared with 12,236 tons for \$151,544 in February, 1950. Mindanao Mother Lode Mines, for the same month, reports 9,800 tons of ore handled for \$162,713; February, 1950, tonnage was 7,400 tons for \$145,722.

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SELL OR LEASE: Who will go into Mexico for millions of tons of high grade copper, gold, silver, ready for quarrying. Should have 1000-ton daily capacity milling and smelting plant. Government documents available. Reply Box E-3, MINING WORLD, 121 Second St., San Francisco 5, Calif.

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or

SUBSIDER

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30 to 36 foot diameter, approximate capacity 100,000 to 140,000 gallons, 4 to 6 tray type. New or used in excellent working conditions. Airmail offers to Mr. O. Ugarte, P.O. Box 1348, Havana, Cuba, stating price, measurements, type, location, delivery date as well as all available data, and enclosing sketch.



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SIZES 8' 6" TO 22' 3" DIAMETER
NUMBER OF HEARTHS, 1-16

ROASTING CALCINING DRYING

ZINC ORES	QUICKSILVER
IRON ORES	MAGNESITE
COPPER ORES	LIMESTONE
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NICKEL ORES	BONE CHAR
LEAD ORES	DIATOMITE
SODA ASH	LIME SLUDGE
FULLERS EARTH	MAGNESIUM
CARBON	CLAY
PYRITE	GRANULES
	ANTIMONY

SELENIUM

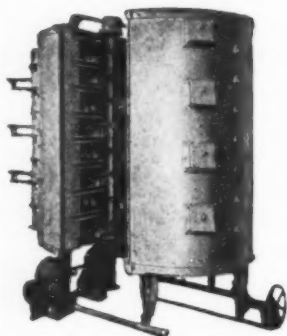
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ENGINEERING BOOKS:

Views and Reviews

AUTOMOTIVE AND CONSTRUCTION EQUIPMENT. By C. W. Lindgren. 1950, 287 pp., cloth bound, 8½ by 11 inches, over 120 illustrations of equipment and working conditions. \$4.50.

The book, while primarily a study in economic use of automotive and construction equipment as it relates to management, capacity and investment, should be of great interest to the mining profession because of its increasing use of trucks and mechanized loading equipment. The book is intended to identify automotive and construction equipment, evaluate the use of it in relation to investment, and prescribe practices that will result in economical operation.

The subject material and format is intended to acquaint the reader with basic information first—knowledge of drivers, mechanics, operators, shops, engines and power, which should be learned by those intending to manage investments in automotive and construction equipment. The chapters cover: The Job to Be Done; The Driver; The Mechanic; The Gasoline Engine; The Diesel Engine; The Repair Shop; The Supervisor (Shop); Preventive Maintenance; The Manager (Operations); The Dispatcher; The Short Haul; The Long Haul; Safe-Driving Practices; Fuels and Lubricants; Light, Medium, Tank, Dump, Fire Fighting and Heavy-Duty Trucks; Buses; Tractors; Graders; Rollers; Air Compressors; and Paving Equipment.

STANDARD METAL DIRECTORY. Atlas Publishing Company, Inc., New York, New York, 818 pages, \$15.

The 1950 Directory is divided into five sections, covering iron and steel plants, ferrous and nonferrous metal foundries; metal rolling mills, metal rolling plants, and smelters of nonferrous metals.

The Directory contains more than 10,000 detailed reports on steel mills, foundries, smelters, rolling mills and nonferrous metal plants, that are located in the United States and in Canada. The plants are listed geographically and alphabetically. The reports give the name of the company, its capitalization, plant equipment, products manufactured, primary and secondary raw materials consumed, names of the company officers, purchasing agent and sales manager.

ELEMENTS OF OPTICAL MINERALOGY, Part II—Description of Minerals. By Alexander N. Winchell, in collaboration with Horace Winchell. John Wiley & Sons, Inc., New York, New York. 1951, 551 pp., 422 figures, charts and illustrations. \$12.50.

The book gives a description of those minerals, the optical qualities of which are sufficiently well known to permit diagnosis by means of a microscope. The minerals are arranged according to a classification based on chemical composition and crystal structure. Developments since 1933 are brought up to date. The most important aspects of mineralogy have been derived from the X-ray study of crystals, resulting in an increase in the knowledge of the crystallization, composition and classification of minerals. Elements, Halides, Sulfides, Oxides, Carbonates, Borates, Sulfates, Phosphates, and Silicates are discussed in separate chapters.

Copies of any of these books may be purchased from MINING WORLD, 121 Second Street, San Francisco, California, U.S.A.

CUT COAL CLEANING COSTS

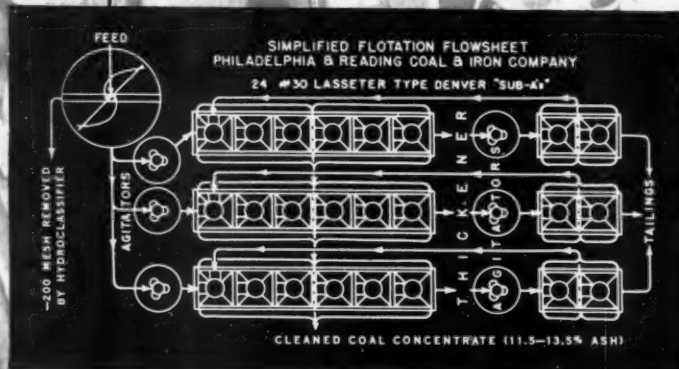
with Denver "Sub-A"
(Lasseter Type) Flotation

Philadelphia and Reading Coal and Iron Company — Now operating at the rate of one ton of marketable coal fines per minute.



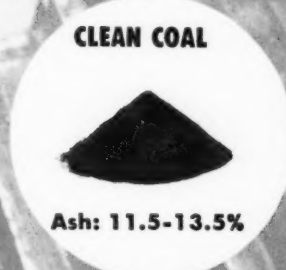
FEED

Ash: 24-30%



REJECT

Ash: 59-65%



CLEAN COAL

Ash: 11.5-13.5%

Products: Anthracite Coal Fines
Particle Size: Minus 10 mesh to plus 200 mesh
Tonnage: 120 TPH initial feed
Flotation Cells: 24 No. 30 (Lasseter type) Denver "Sub-A" Cells
Flotation Concentrate: Sixty tons per hour (One ton per minute)
Ash Content: 11.5-13.5%
Reagent Cost: Less than 15 cents per ton feed

Write for Bulletin M4-857

BE SURE TO SEE
DENVER COAL FLotation IN ACTION—
At the Cleveland Coal Convention & Exposition,
May 14-17.

Write for descriptive literature on the Philadelphia & Reading operation and the complete Denver Flotation process to be seen at the Cleveland Coal Convention and Exposition.



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PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD's way of making available to you some of the finest current information on mechanization.

FREE-LITERATURE PREVIEW

To get any item of free literature illustrated or described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP postcard, fill out the PEP card completely, and drop it in the nearest mailbox.

FLOTATION INDEX: 1950 edition of Dow Chemical Company's authoritative guide to published material on flotation methods is now available. Copies may be obtained by writing to Dept. B, Dow Chemical Co., 310 Sansome Street, San Francisco, or by circling 21.

ORE-DRESSING EQUIPMENT: DECO's latest 8-page issue of "Standard Ore Dressing Equipment" in stock describes guaranteed new and used equipment available now for all phases of milling. Circle 28.

CRUSHER: Write to Nordberg Mfg. Co., Milwaukee 7, Wisc., for detailed information on a Symons Cone Crusher to meet your specific needs, or for contact information concerning the Symons, circle 100.

HYDRAULIC DIAMOND DRILL: A new 4-page bulletin describes the Hydraulic Diamond Drill and Expansion Rotary Diamond Cutter. The new product is marketed by Continental Ventures, Inc. Get your copy of this new bulletin by circling No. 42 on the PEP card.

DIAMOND DRILLING: J. K. Smit & Sons of Canada have underwritten the cost of publishing a new book, the "Diamond Drill Handbook." It's a 500-page book written by James D. Cumming and is packed with tables, histories, information, advice, methods. Get your copy by sending \$6.50 to J. K. Smit & Sons, Inc., 157 Chambers St., New York 7, New York, or through Smit offices in Canada, Britain, Holland, or France.

PORTABLE LIGHTING SYSTEM: Ideal for underground mining, a new, low-voltage portable lighting system which powers four sealed-beam flood or spot lights with an air consumption of only 25 cfm., is described in "Joy-Lite Bulletin 87-1-MW", now available by circling No. 48.

DIESEL-POWERED TRUCKS: Two new 16-page booklets describe the standard models of Euclid Equipment that are available with Cummins Diesels and with General Motors Diesels. For your copy of ECE-10 which gives information on five Cummins from 165 to 300 hp. and 11 earth movers from the 15-ton model 80FD to the 40-ton bottom-dump coal hauler, circle 30. For your copy of EGM-1 which gives information on GM diesels from 125 hp. to 190 hp., on GM torque converters, and 7 models of "Euc" equipment, circle 31.

CHAIN SAW FOR FRAMING: For information on Vulcan Iron Works' portable, 46-pound, air-powered chain saw for mine timbering, pile trimming and heavy framing, circle 86.

VARIABLE-SPEED TRANSMISSIONS. A new power-transmission unit allowing smooth, stepless, accurate speed variation, Worthington Pump and Machinery Corporation's new Allspeed Drives, in sizes of 1, 3, 5, 7 1/2, 10, and 15 hp., are described in a new series of "Worthington Allspeed Bulletins," now available from MINING WORLD. Circle 26.

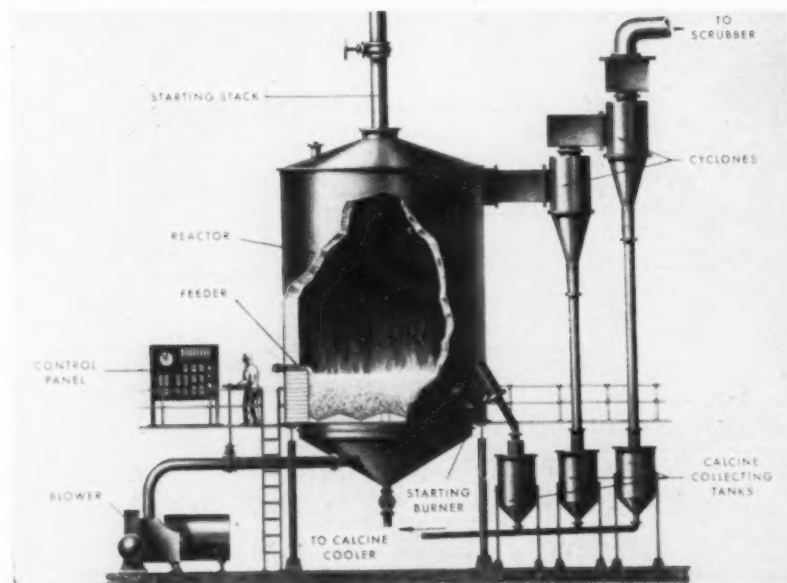
LOADER: The Joy Manufacturing Company 18-HR-2 loader, designed for high-capacity tonnage in metal and non-metallic mines, is described and illustrated in a new bulletin. Bulletin No. J-108. Circle No. 4.

SLURRY PUMPING: Literature covering operational data, design specifications for a variety of ores and materials obtainable from Morris Centrifugal Pumps, Baldwinsville, N. Y., or by circling 75.

DIGGER: A new, two-color, 12-page booklet released by the Marion Power Shovel Company, gives a complete design and performance story on the 111-M, which, equipped with diesel power, electric swing and Marion air control, is available for service as a shovel, dragline, clamshell, crane, or long-range shovel. Get Bulletin No. 402 on the 3- to 5-yard 111M by circling PEP No. 25.

DIAMOND DRILL: Detailed information and complete specifications on the Joy 22-HD heavy-duty Diamond Core Drill, driven by gasoline, electricity, or compressed air, and mounted on truck, steel skids, or underground column, is contained in Bulletin "Joy D-28". Circle 59.

NEW FLUOSOLIDS ROASTER PROVES MEANS OF CHEAPLY PRODUCING SO₂

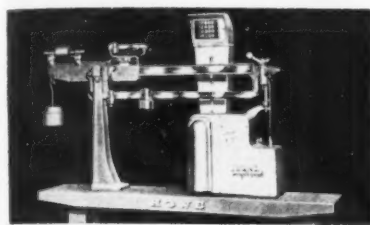


The Dorr Company, in an announcement of recent production tests, reveals that the Fluosolids Reactor is an efficient device for producing SO₂ for consumption as the gas or for use in the making of sulphuric acid. In the tests, pyrite and pyrrhotite, as repulped flotation concentrate of 80 percent solids or as massive ore crushed to 14 mesh, are roasted in the FS Reactor with a minimum of excess air. The gaseous product then contains approximately 10 to 15 percent of available SO₂ with a minimum of SO₂; the calcine then contains a maximum of 1.5 percent sulphur.

In the illustration of the FS Reactor, ore is fed continuously into the combustion chamber by the screw conveyor on the left. The blower supplies air to roast the ore to a fine calcine which is then blown out the exhaust, recovered by two cyclone dust collectors in series, and dropped to calcine-collecting tanks. Once started, the fire in the FS Reactor is self-sustaining. For further information on this radically new roasting unit, circle No. 82.

Scale Attachment Flashes Instant Weight Reading

The Weightograph is a new attachment for beam scales; it mounts on the beam shelf and attaches to the beam with a rod; when an object is placed on the



scale the Weightograph instantly flashes the correct weight on a large periscopic screen designed to be read at a distance. The image is read from a mirror in a system which eliminates parallax.

For information concerning the conversion of any regular beam scale (or any scale which is convertible to beam operation) to an "automatic," circle 84.

New Radiation Meter Low-Cost 1½-Volt Batteries

A new product of El-Tronics, Inc., is the small rugged Model PR-3 Radiation Survey Instrument specifically designed for portable and field use in measuring radiation intensities (Beta or Gama) from all radioactive elements where a source of AC power is not available. The unit is waterproof, fungus proofed and has a provision for plug-in phones.

Some of its many applications are prospecting for radium, uranium, etc.; geological survey work; measuring radiation intensity, locating lost radium, radioactive tracer; measuring X-ray leakage and oil-well prospecting and surveying.

New features on this instrument are: Vibrator power supply. Operates from two 1½-volt low cost batteries, navy type varicolored sliding scale meter, no possible error in interpolation, lighter, improved rotating type beta ray shield, lower, wider aluminum case less easily tipped from tilted surfaces. Get further information by circling No. 80 on the PEP card.

Wooldridge Joins Mack to Produce Haulage Trucks

Under a recently signed agreement between Mack Mfg. Corp. and the Wooldridge Manufacturing Co. of Sunnyvale, Calif., the western company will partially produce and fully assemble Mack off-highway vehicles especially designed for western needs.

Worthington-Gamon Meter Now in Worthington Corp.

Worthington-Gamon Meter Company, Newark, N.J., formerly a subsidiary of Worthington Pump and Machinery Corp., has been made a division of that corporation.

The new division will continue the manufacture of liquid meters at the former company's Newark plant, according to H. C. Ramsey, president of Worthington Pump and Machinery Corporation, Harrison, New Jersey.

Robert R. Anderson, formerly president, Worthington-Gamon Meter Company, has been elected vice president of Worthington Pump and Machinery Corporation and will act as general manager of the new division.

William C. Flanders, formerly vice president of the meter company, has been appointed assistant general manager of the division, and Walter H. Zeis, formerly secretary and treasurer of the meter company, has been elected assistant secretary of the Worthington corporation.

I-R Announces Large-size Lightweight Compressor

A new type of large-size portable air compressor has been announced by Ingersoll-Rand. It features a rotary type compressor. The unit is designated as the Gyro-Flow 600. It delivers 600 actual cfm. free air at 100 psi. Total weight is only 9,500 lbs. ready for use, making the Gyro-Flow by far the lightest weight portable compressor in its capacity range. Major advantages claimed by the manufacturer are simplicity and low cost of operation and maintenance, greater reliability, lighter weight, and a discharge temperature at least 100°F lower than that of conventional portables.

The compressor itself is an advanced-design, two-stage, oil-cooled rotating-vane compressor. It eliminates pistons, con rods, valves, and the need for a clutch. Air is discharged at less than 200°F under normal operating conditions. This, together with thorough oil separation, eliminates hose deterioration which is caused by heat and oil.

For more information, write to Ingersoll-Rand Company, 11 Broadway, New York 4, N.Y., or any of its branch offices. Or circle 77.

Turbo Mill Will Run Free Tests on Various Ores

The Turbo Mill is a new approach to the problem of dry concentration. Manufactured by the Turbo Mill & Pulverizer Company, 321 Embarcadero, Oakland 6, California, the new device consists of a hammer mill, an adjustable screen, an exhaust blower, and a dust-collection system. Finely ground ore is carried by the exhaust blower through a tapered sloping duct; as velocity of air decreases because of the increase in the cross-section of the duct, heavy and coarse material settles from the air stream. Tests on various copper, tungsten, gold, and other ores has shown the Turbo-Mill to be an efficient device for upgrading low-grade ores.

The mill is portable, comes equipped with its own diesel-generator power supply, and can be placed on a simple foundation. To see if the Turbo-Mill is the answer to your problem of concentrating low-grade ore, the company will run milling tests on 200-pound lots of ore. For further information on the mill, circle No. 88.

Thor Announces Purchase of British Drill Plant

The purchase of Armstrong-Whitworth and Company, Pneumatic Tools, Ltd., Gateshead-on-Tyne, England, for nearly a century one of the largest and most

prominent of British industries, by Independent Tool Co., Aurora, Illinois, manufacturers of Thor portable power tools, is announced by Neil C. Hurley, Jr., Thor president.

The Armstrong-Whitworth pneumatic tool company and its big Close works section in Gateshead with a force of 750 employees now become an affiliate of Independent Pneumatic Tool Company, Ltd., London, England, a subsidiary of the parent company operating in Aurora, Illinois, and Los Angeles, California, plants and 20 branches in the United States and Canada, Thor Tool Hemisphere, Inc., Sao Paulo, Brazil, and Thor Tool Continental, Inc., Antwerp, Belgium.

Mr. Hurley announced that Robert G. Faverty, former manager of Thor branches in Chicago and Detroit, has arrived in Gateshead to assume immediately the position of managing director in charge of the new Thor property.

Also in Gateshead to lay out plans for an early expansion of the pneumatic tool works are E. R. Wyler, Thor vice-president and director of exports, and James A. Perham, chief engineer at Thor's Aurora works. Mr. Perham is also planning with Armstrong engineers certain Thor pneumatic tools to be put into production in England.

New 14-Lb. Low-Thrust Air Saw Cuts Large Timbers

Wright Power Saw & Tool Corp. has recently begun production of a straight-blade air saw which uses twin reciprocating blades in a design which neutralizes end thrust, eliminates torque. The saw weighs only 14 pounds and yet is capable of cutting even the largest mine timbers;



cutting 10 to 20 times faster than by hand the new saw is finding its way into large underground mines in the U.S. and abroad. The Precision Power Saw uses 60 cfm. of air. The interlocking blades are designed for cross-rip, or angle cutting, cut a 3/16-inch kerf, can be changed in three minutes and are then sharpened by conventional means. For further information on the saw, its price, and availability, circle No. 83.

DECO Will Demonstrate Coal Flotation at Conv.

The Denver Equipment Company will demonstrate flotation of fine (minus-10-mesh) coal in a small pilot plant consisting of 2 Denver "Sub-A" (Lasseter-type) flotation cells at the 1951 Cleveland Coal Convention. William F. "Bill" Haddon will be in charge of the exhibit at booth 934; and Henry J. Gisler, Chief Metallurgist of DECO, will be on hand all during the exhibition from May 14 to May 17 for technical consultation on all phases of coarse and fine coal flotation.

precipitates—SOUTHWEST



DANIEL S. DINSMOOR has been appointed vice president in charge of research and development for the American Potash & Chemical Corporation, Los Angeles, California. The company has just launched an expanded research and development program designed to produce new products through improved techniques. Dinsmoor, who left the Monsanto Chemical Company in 1948 to join American Potash, will direct activities of the new research program at both the Los Angeles headquarters and at the Trona, California, laboratories.

development program designed to produce new products through improved techniques. Dinsmoor, who left the Monsanto Chemical Company in 1948 to join American Potash, will direct activities of the new research program at both the Los Angeles headquarters and at the Trona, California, laboratories.

Kennecott Sets Output Record; Opens New Mine

J. C. Kinnear, Jr., general manager of Kennecott Copper Corporation's Nevada Mines Division, advised that 1950 copper production by the company totaled 64,491 short tons compared with 37,789 tons in 1949. Ore production totaled 6,626,000 dry tons compared with 4,847,536 tons in 1949. The McGill concentrator, which has a rated capacity of 18,000 tons of ore daily, increased output in 1950 to an average of 19,437 tons. Improvements in mining methods during the year were responsible for a new record in the pit of 71.01 tons of ore and rock handled per man-shift.

A new source of copper ore for the company will be the Kimbley copper mine near Lane City, between Ely and Ruth. The property is said to contain 3,500,000 tons of ore. The company is starting development, expected to be completed in 1953, and operations will be by the openpit method here also.

Tungsten Mining Starts Reviving in Nevada

The high price and demand for tungsten have already stimulated mining of this metal in Nevada, and among the numerous reports received relating to mine openings and increased production, the following properties have been mentioned:

In Nye County, the Gabbs Exploration Company has just completed and has in operation a 100-ton mill after two years of careful exploration including trenching and diamond drilling. The company's tungsten claims lie in the Lodi Hills about 10 miles north of Gabbs Valley and 40 miles northeast of Luning. Mining and milling are under the direction of Lee Dougan of Salt Lake City, president.

In Mineral County, the Lindsay Mining Company is mining from the Gunmetal openpit, 24 miles southeast of Mina. This company has a new 100-ton mill. Kenneth Dunham of Lindsay, California, is in charge of operations. The Nevada Tungsten Corporation, after a several-

year shutdown, is said to have begun running tailing from the Silver Dyke mine through the flotation mill at Soda-ville, just south of Mina. A new tungsten prospect is being investigated by Al Stevens and Gerald Hartley near Montgomery Pass. They are said to be making plans to build a road to the claims from U. S. Highway 6 and to start stripping operations by bulldozer.

In Pershing County, Nevada-Massachusetts Company is now mining tungsten ore from the Stank, Humboldt and Sutton shafts and from four openpits. Daily mill output is reported to be 400 tons. Glenn Emminger is in charge.

In Humboldt County, Getchell Mine, Inc., at Red House is continuing to mine tungsten rather than gold, producing from both the Granite Creek and Alpine mines. The United States Vanadium Company is contemplating resumption of operations at the Riley mine a few miles south of Getchell. Bill Hoskins and John Etchard of Winnemucca are preparing the Valley View tungsten mine in the Potosi district for operation.



Phelps Dodge Corporation, Morenci, Arizona, hopes to be producing a marketable molybdenite concentrate during the current year. The company's experimental unit, placed in operation in November, 1949, was operated throughout the year treating a portion of the copper concentrate production to recover molybdenite as a concentrate. The results obtained, although erratic, were considered encouraging. The molybdenite content of the copper concentrate at Morenci is very low.

Ralph D. Brooks and associates have purchased the Maudina tungsten mines at Oracle, Arizona, according to Carl B. Lancaster of Oracle, manager. Underground operations are planned as soon as equipment is moved from Nevada. The Old Maudina mine produced 100 tons of scheelite concentrates during World War I and the New Maudina mine produced about 6,000 tons of scheelite, mined by openpit methods, during World War II. Brooks' address is Glenbrook, Nevada.

Magma Copper Company purchased 187,040 shares of the San Manuel Copper Corporation during 1950 and now owns all the outstanding shares of that company. Preliminary underground development is continuing at San Manuel's big copper property at Tiger, Arizona, and plans are underway to provide for financing development and equipment for the mine, including a complete plant, for production. During 1950 Magma, operating at Superior, did 11,344 feet of drifting, crosscutting and raising and milled 423,464 tons of copper-zinc ore.

A carload of mine timbers is being

trucked in to the Unida mine, under development by United Mine Operators, Inc. Considerable preliminary work has been completed and the company expects to be working on a larger scale within the next 30 days. Ernest Sturrock, Box 836, Wickenburg, Arizona, is superintendent.

A group of mining men have organized the Tennessee Metals Corporation at Kingman, Arizona, and have acquired several lead-zinc mines in the Chloride district, including the Tennessee, Summit and Alpha. The new company is also expected to contract for ore from the Copper Age, Champion, Detroit, de la Fontaine and other mines in the area. After the project is examined by the Defense Minerals Administration, and if it approves a loan, Tennessee Metals hopes to start producing at a rate of 150 tons monthly by summer and to increase production to 300 tons shortly thereafter (the present mill at Tennessee mine has a capacity of 150 tons, which will have to be raised). The men in the organization are Ralph R. Langley, president, Box 1266, Kingman; R. H. Leshner, secretary-treasurer, and Charles P. Elmer, a director.

The Manhattan Consolidated Mines Development Company of Manhattan, Nevada, is said to have arranged to buy the Scribner lead-gold-silver mine and its machinery at Elfrida, Arizona. J. Fred McColloch of Los Angeles is president of Manhattan. The Scribner is owned by Dr. Edwin Larson of Los Angeles and at last reports was producing 250 tons of ore monthly.

The Buckeye Mica Company, Buckeye, Arizona, is doubling capacity of its grinding mill to boost production from 60 tons weekly to more than 100 tons. According to Walter L. Tocco and H. G. Smith, president and secretary, respectively, the expansion program will be paid for out of profits from the sale of beryl to the U. S. Atomic Energy Commission. The company has been shipping about 600 pounds of beryl crystals, which occur in the muscovite mica deposit, to the AEC plants. Buckeye Mica is operating at group of 11 claims in the Weaver District of Yavapai County. At present only three men are employed in drifting operations, but plans call for erection of a gallows frame, hoist and mill installation. Robert C. Burns of Yarnell, Arizona, is superintendent. In addition, the company is producing about seven tons of sericite mica each week from other claims located about four miles south of Buckeye.

Small shipments of lead-zinc-copper ore are being made from the Boston Arizona mine by the Sullivan, Smith and Mario Company, A. J. Sullivan, manager, Skull Valley, Arizona. A winze has been sunk to the 100-foot level and old workings are being unwatered. A drift is being run along the footwall, around the old shaft.

The Copper Butte Mining Company, C. F. Mitchell, manager, Ray, Arizona, is shipping about 600 tons of ore monthly

from its open-cut workings. The property is located in the Mineral Creek District, Pinal County. Four men are employed.

Production of 125 tons of asbestos monthly is reported from the *Gila Asbestos Company*, working the Buckhorn and Wilson group of claims. Twenty men are working on a two-shift basis under the direction of Ed Phelan, superintendent, Globe, Arizona.



About two miles northeast of Willow Springs and a miles west of *Burton Brothers' Tropico* mine at Rosamond, California, a discovery of autunite has been made, according to Glen A. Settle of *Burton Brothers*. Investigators from the *U. S. Atomic Energy Commission* and the *California Institute of Technology* are said to be testing the find.

The *Coronado Copper and Zinc Company* is diamond drilling a gossan outcrop northwest of the *Afterthought* mine (owned by the company) at Ingot, California. The property being investigated is owned by the Cook estate and known as the Lyon Street Trust.

Additions to the existing plant at the *Penn* copper and zinc mine to increase output about 150 percent have reportedly been planned by *Penn Chemical Company*, Campo Seco, Calaveras County, California. According to C. F. Fisk, one of the operators, about 60 tons of ore is being crushed daily.

Reports from Mohave, California, say that George Nolan and S. G. Hubbard are supervising the work of rehabilitating the old *Kingfish* mine in the Hualpai range. A shaft is being cleaned out and retimbered. Records on the mine show that two carloads of silver-gold-lead-copper ore were shipped many years ago. The new operators expect to know the probable scope of operations by this summer when preliminary work is finished.

The *Permanente Cement Company* has begun operating its fifth kiln of 1,400,000 barrels capacity of cement yearly at Permanente, California. Total capacity of the cement plant is now 7,000,000 barrels a year.

The Bureau of Land Management at Los Angeles, California, has reported the release of 2,320 acres of land to mining in the Superstition Mountains. The acreage is in T. 14 S., R. 11 E. of Imperial County.

Mr. William M. McKeever of Darwin, California, has advised us that he no longer is associated with Donald F. McGrew in the *U. S. Tintype Corporation*, formed for the development of tin prospects in the Argus Range. McKeever said that their association terminated last October.

The California State Division of Mines and the Tidewater Associated Oil Company each have examined extensive deposits of expansible-grade perlite which appears to be suitable for making lightweight aggregate materials. The deposits occur along Green Creek in Section 15, T. 5 N., R. 3 W., M.D.B. & M., about five miles north of Cordelia, California, according to the Division.

Regular gold production is reported



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Construction view of the flotation building with 30'x 20' thickeners in the foreground



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coming from the *Sunset* mine in the High Grade district, Modoc County, California, where a new 25-ton Huntington mill has been operating for several months. Ore is crushed to one-inch size by a jaw crusher and ground to 50-mesh; mill discharge is concentrated on a Stephan table. Gold occurs in quartz veins and stringers on the property which is owned by J. R. Quimby, Raymond Powell, Elmer Ahlstrom and B. C. Bolton of Lakeview, Oregon.

Chrome mining is being stimulated by present war conditions and the *Pilliken* chrome property in El Dorado County, California, may be reopened after several years of idleness. Placerville mining men are said to have requested funds from the Reconstruction Finance Corporation for a beneficiation plant at the property. The *United States Chrome Mines, Inc.*, used to run the *Pilliken*. Northeast of Crescent City, Del Norte County, *Holiday Mining Company* is mining chrome and several mines in the French Hill district are reported active.

F. J. "Cap" Young of Bridgeport, California, is stripping over-burden from a copper-bearing deposit in the Mono Lake district. Mineralized section is said to average about 180 feet wide and may be several miles in extent in the sulphide zone, but he says this fact is not yet definitely known. He hopes to have the showing core-drilled this year. A road was recently completed to the property.

A new hoist has been installed at the *Keane Extension Mining Company's* mine at the California-Nevada line in the Death Valley area, according to Mike Harris, owner, of Beatty, Nevada. The new hoist, replacing an old one which was too slow, was designed by the Harris brothers and has a maximum winding capacity of 2,000 feet per minute.

C. Hyde Lewis and A. D. Lane and associates are mining bentonite in San Benito County, California, Lewis from a deposit in the Vallecitos Hills district and Lane from another mine several miles away.

Dr. Frank I. O'Neill, physician of Oroville, California, and several associates reportedly have incorporated the *Yolo Iron and Metal Company* in Nevada, and supposedly plan to build a steel plant in Central California to cost \$264,000,000, if government aid can be obtained. Promoters of the project say they have optioned California property containing 200,000,000 tons of iron ore.

Arthur Wertz and associates are said to be extending an adit in the Los Aguilas Canyon north of Panoche, San Benito County, California, to develop copper orebodies which outcrop on the surface. In the same district operators are considering substantial development of the *Antelope* copper mine.



Basic Refractories, Inc., is said to have ordered a 50-ton an hour HMS plant to concentrate brucite at its Gabbs, Nevada, property. During 1950 Basic spent \$1,328,156 to complete facilities with which to manufacture magnesia refractories.

Consolidated Coppermines Corporation

has resumed mining operations at the Morris mine in the Kimberly district in Nevada. The Morris, an underground mine, was shut down in the middle of



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1949 for economic reasons. It is now being mined by openpit methods and will provide an estimated 50,000,000 pounds of copper in the next two years, according to Chester D. Tripp, president. Meantime the company has discovered another small orebody on its holdings and may openpit-mine it.

W. A. Flower of Tonopah, Nevada, has sold half of his interest in the War Eagle group of 11 claims to Ed Doty and associates of Tacoma, Washington, who will start work at the property soon. The group lies in San Antonio Canyon, the west branch of Meadow Canyon, and contains values in gold and silver. Past development amounts to one crosscut tunnel, 480 feet long, driven to cut the vein at a vertical depth of 250 feet, and several shallow surface pits. The tunnel never reached the vein so its completion is the first work to be done by the new operators. Also a mile of new road will be constructed and then a shaft sunk by the surface workings.

The Ralston mercury mine at Cuprite, Nevada, reportedly has been sold by Mrs. Mary K. Moross to Howard P. Ritsch of Chicago. He has renamed the mine the *Duly Ritsch* and may reopen it if mercury prices remain high. Near McDermitt, repairs at the *Cordero* mercury mine are being continued but no plans to reopen are in the offing.

Earl G. Schulz and Byron T. Berge have discovered radium in the Monte Neva Hot Springs sinter near McGill, Nevada. An AEC examination showed no uranium, but the men are still attempting to find a commercial use for the material.

During 1950 Summit King Mines, Ltd., at Fallon, Nevada, milled 18,287 dry tons of gold-silver ore with a net profit before Federal Income Tax of \$11,426.34. According to Percy G. Dobson, manager, ore reserves are estimated at 6,000 tons and an additional two or three thousand tons of ore may be available from unexplored sections of the hanging wall vein and near the surface west of the face of the 80 level.

The U. S. Bureau of Mines' \$600,000 manganese pilot plant to be built at Boulder City, Nevada, will be constructed by the F. C. Torkelson Company of Salt Lake City, according to an announcement by J. H. East, Jr., Denver, Colorado, Region IV director of the Bureau. The work will be completed within three months. The plant will have a 50-ton daily capacity.

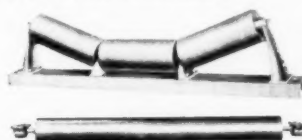
The Tungsten-Carbide Company reportedly has bought the holdings at Rawhide, Nevada, of the Nevada Scheelite Company, and is planning development under the direction of A. R. McGuire of Fresno, California, general manager. Tungsten-Carbide is a subsidiary of Kennametal, Inc., of Latrobe, Pennsylvania.

NEW MEXICO

The Santa Fe Pacific Railroad Company has modified its exploration program consisting of bulldozing overburden and sinking test pits on its uranium occurrences near Grants, New Mexico, because of increasing depth of overburden. Mor-

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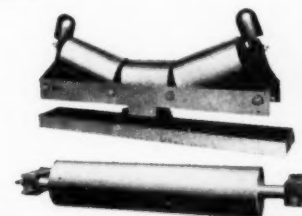
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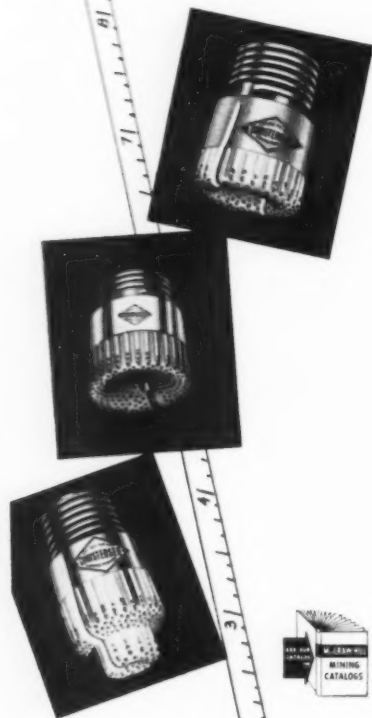
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rison-Knudsen Company, Inc., contractor of Boise, Idaho, is presently engaged in sinking test holes, using wagon drills capable of drilling to 100 feet if necessary. Tom Evans, mining engineer of the railroad company, is directing exploration.

The Great Western Mining Company has begun shipping mica from a new development near Mora in northern New Mexico. Secretary-treasurer Robert Katson reports. He said the firm soon expects to be sending out 40 tons of mica daily from its \$150,000 mill.

Clark Mathis and John V. Clark report they are opening the Mahoney mine 24 miles south of Deming, in the Tres Hermanas Mountains. The development is an openpit lead-zinc mine.

The Anaconda Copper Mining Company is core drilling for uranium on some leases near Grants, New Mexico. Anaconda has opened an office at Grants under John Knable. One report said the firm also may be investigating copper occurrences in the area.

The Gloria Mining Company's fluor spar division expects to put the Animas fluor spar mine back into production, 17 miles south of Lordsburg. Development work is being supervised by C. J. Burnett.

Merle Horzmann of Colonial Enterprises says that as a result of the effort to get a custom mill in the Lordsburg, New Mexico, area, there are several mining claims being leased and prepared for operation. Several other claims, already in operation, have promised tonnage. Among old mines now being worked are several in the Leitendorf area, Pyramid copper-silver district, the Anita in Valedon, the Ruth, the Rosa Group, the Green King Group and Lee's Peak in the Virginia district. These mines produce gold, silver, copper and/or lead. In the Steins area, San Simon district, the Silver Hill and surrounding claims are being re-activated, and the Silver Hill is shipping.

W. P. Morris, Duval Sulphur and Potash Company general superintendent at Carlsbad, said the firm expects to be in production very early in 1952 as the fourth potash producer in the area. Both of the new firm's shafts are well below the 620-foot level and construction on the surface plant was progressing well.

F. H. Stewart, Southwest Potash Corporation general superintendent at Carls-

bad, New Mexico, said the firm's shaft-sinking operations and plant construction are proceeding on schedule. By mid-March both concrete-lined circular shafts, 15 and 20 feet in diameter, were at approximately 120-foot depths.

The New Mexico School of Mines at Socorro has a new name—the New Mexico Institute of Mining and Technology. The name change, authorized by a bill signed by the governor, will be used as a convenience, except in financial transactions.

The Fink and Dudley interest has leased the American National and King Gold mines from M. J. Fowles. The interest has perfected title to a large group of claims adjoining the two gold properties, located in the Eureka Mining District in southern Grant County, New Mexico.

Geolite Company of Santa Fe is doing further development work on the manganese occurrence discovered and partially opened last year by Duain Mangum and Lee Logan of Magdalena. The firm's lease is toward the southwest end of the Magdalena Mountains. W. K. Pratt is operator.

The Bearup silver-gold mine, 11 miles from Glenwood on the edge of the Mogollon district, is being readied for development for Harry M. McQuigg of St. Elmo, Illinois. Work on the 40-odd claims is being done by E. A. Montgomery and a small crew of men. The property, boasting a spasmodic production record and a mill, last was worked by Ira L. Wright of Silver City, who shipped 101 carloads from the mine. Values principally are in silver as cerargyrite and argentite with some native silver and gold. The proportion of gold and silver in paying ore normally is about 70 to 1.

The Zuni Milling Company, fluor spar-producing subsidiary of the Shattuck Denn Mining Corporation, is increasing production from its mine south of Grants, New Mexico, because of the rise in orders both from the Government and other purchasers for fluor spar. Zuni makes acid-grade fluor spar at its mill at Los Lunas.

Skip Clark and Bruce Leake are producing an occasional carload of lead-zinc ore from the Grandview mine in the Hembrillo mining district of Dona Ana County, New Mexico.

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AEC to Build New Uranium Ore Refinery in Ohio

The United States Atomic Energy Commission has announced plans for the construction of a \$30,000,000 uranium ore refinery and other facilities for the production of uranium feed materials on a 1,200-acre site 19 miles northwest of Cincinnati, Ohio. The Fernald Area, a new unit of the New York Operations Office, has been established to administer operations of the new plant, known as the Feed Materials Production Center. James F. Chandler, a civil engineer, has been named area manager. Designer of the plant is the Catalytic Construction Company of Philadelphia, Pennsylvania.

The plant will convert uranium ore or concentrates into "brown oxide" (UO_2) with simultaneous removal of impurities. The next step, also a complicated one, sees the brown oxide converted into "green salt" (UF_6). At this point the path branches, depending upon whether the material is destined for Hanford, Washington, plutonium piles or Oak Ridge, Tennessee, separation plants. In the former case the green salt must be reduced to metal billets, another industrial project of complexity; the billets are then processed into slugs of suitable size and shape for insertion in the Hanford reactors. If Oak Ridge is the terminal point, however, material in the green salt stage becomes converted, again through special and large-scale plants, into uranium hexafluoride (UF_6).

Bethlehem to Start Mine and Mill Project in Pa.

Concerning Bethlehem Steel Company's iron property near Morgantown, Pennsylvania, A. B. Homer, president, said the deposit lies at a depth of 1,500 to 3,000 feet below the surface; the ore is the magnetic type which can be concentrated into a product with a 60 to 70 percent iron content. Initial development is about

to begin with the sinking of one of two shafts. A beneficiation plant to concentrate and pelletize the ore also will be built. Shipments are expected within two to three years. The pyrite extracted from the ore in the concentrator will be shipped to Bethlehem's Sparrows Point, Maryland, works and will be converted into sulphuric acid in a new plant to be built for the purpose. An eventual working force of about 1,250 employees is envisioned at Morgantown.

Certificates recently were issued by the Defense Production Administration to Bethlehem Cub Iron Mines of Morgantown for \$34,000,000 for five-year amortization for development of pyrite and iron ore.

IM&C Will Build Florida Phosphate-Uranium Plant

The International Minerals & Chemical Corporation, after several years of development and expansion of its Polk County, Florida phosphate properties, now plans to construct a phosphate chemical plant costing about \$10,000,000 and designed to recover uranium as a by-product, according to Louis Ware, president.

The plant, to be located on a 27-acre site near Mulberry, should be completed within a year. It will produce 100,000 tons of defluorinated phosphate yearly and unstated amounts of multiple superphosphate and uranium compounds. New processes will be incorporated in the plant as a result of pilot-plant tests during the past two years by the corporation's research division.



The Carolina Mineral Company has begun construction of a feldspar flotation

plant just north of Spruce Pine, North Carolina, according to R. W. Lawson of Kona, president. The plant, to be about one-fourth the size of the company's Kona plant, will process between 150 and 200 tons of alaskite (pegmatite granite) daily and will be completed about August 15. Approximately 40 to 50 persons will be employed. Carolina Mineral's Kona plant is said to be the first plant to use the flotation process to produce feldspar, fine mica and iron-free quartz sand from Carolina alaskite.

The option which the Freeport Sulphur Company recently obtained on sulphur-bearing property from the Virginia Iron, Coal and Coke Company, gives the former the right to purchase land and mineral rights on about 7,700 acres of land in Carroll County, Virginia. It is a pyrrhotite property extending for about 11 miles. The purchase price is approximately \$2,500,000. Investigations have already begun to determine whether to exercise the option. With sulphur in short supply the company is interested in any additional sources of production of that mineral in any of its forms, according to J. C. Carrington, assistant to the president, New York.

A new bulk-handling conveyor system to provide additional ore-handling facilities for the Alabama State Docks and Terminals at Mobile, Alabama, is being installed by The Rust Engineering Company of Birmingham and Pittsburgh at a cost of \$750,000. Incoming ore will be received from the unloading towers by the new system of conveyors and transferred to a shipping-out bin or to bulk storage.

Well underway is St. Joseph Lead Company's program to increase output from its Balmat, New York, mine and mill. A 3,900-foot drift is 84 percent completed on the 900-foot Balmat level, an 875-foot shaft has been sunk 217 feet so far, equipment is being installed, and a new substation has been completed. The mill capacity is being raised from 1,200 tons

RUGGLES MINE PRODUCES FELDSPAR, BERYL, MICA & RARE EARTHS



The Ruggles mine at Grafton, New Hampshire, was opened in 1801 as a mica mine and has been operated intermittently since then. For the past 20 years it has been operated by the Whitehall Company, primarily for feldspar. During the past year the mine has been producing about one carload (50 tons) of feldspar per day. As by-products about 40 tons of mica and 60 tons of beryl were produced last year. A wagon drill is used for drilling, a 1/2-yard power shovel for loading broken rock, and there is a small sorting and screening plant for separating the ore. According to William J. Alexander, several rare earth minerals are found at the mine, including autunite, torbernite, uranophane, gummite, rugglesite, and graftedite.

daily to 1,800 tons daily. The scheduled completion of the project is 1952.

The American Zinc, Lead and Smelting Company expects to finish development of the Grasselli mine in Tennessee by late 1951 and will start ore production at that time. As part of the development program, an incline to develop deep ore-bodies recently was completed. The company has announced that proven and probable zinc ore reserves in Tennessee assure a minimum of 15 years' production at the present rate of extraction.



The Aluminum Ore Company has completed its expansion program at its East St. Louis, Illinois, works with a resultant 100 percent increase in alumina production capacity.

Discovery of columbium in Arkansas was announced March 14 by Wayne C. Fletcher, executive director of the Arkansas Resources and Development Commission at Little Rock. He said samples of the metal were taken on land owned by Billy G. Wilson, Hot Springs.

In its annual report the Federal Mining & Smelting Company advised that a substantial quantity of zinc ore had been developed on the Tinsley fee and on the Mattes lease in the Joplin, Missouri, area. The Duncan tract is being rehabilitated and should be in operation soon and custom milling at both the

Duenweg and Northside mills contributed to annual earnings. These earnings from the Tri-State field, before deductions, amounted to \$12,459.53.

After two and half years of development, production at the new zinc-lead mine of Calumet and Hecla Consolidated Copper Company at Shullsburg, Wisconsin, officially began on January 1, 1951, at a rate of 550 tons of ore daily, reached 650 tons daily during February, and is expected to increase to about 1,200 tons daily by summer, according to Endicott R. Lovell, president. The company operated seven mines during 1950 and their production plus that of reclamation plants, secondary, custom and toll operations resulted in an output of 83,963,512 pounds of copper in 1950.



The 1951 iron ore season, according to predictions, will show an increase in the all-rail shipment record of 1950, which was about 2,500,000 tons. The cost is considerably higher than by lake boats, but the railroads will be used to augment the capacity of lake shipping facilities.

The Seville mine, operated by Rhude & Fryberger, is being stripped on a two-shift, six days per week schedule. Men are being called back to the Atkins and Wanless mines of the Cleveland Cliffs Iron Company, and both mines were

busy in April. All this makes the Kinney, Minnesota, area an active one.

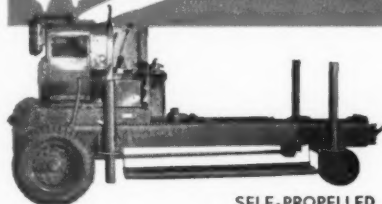
The Pacific Isle Mining Company has produced about 55,000 tons of openpit ore from its lease near Randall in Morrison County, Minnesota. The ore runs 54 percent dry but has a high moisture content, making it sub-grade on "natural" analysis, which is the way ore is sold. As far as is now known, there is no large tonnage of this grade of ore remaining. A larger tonnage of ore which runs about 40 percent in iron is available. A sufficient amount of this material has been stockpiled so that experiments may be carried on for its beneficiation. In the meantime, the pit has been allowed to fill with water pending a satisfactory solution to the beneficiation problem. About 50 feet of stripping was removed to uncover the ore.

Pickands Mather & Company is sinking a new vertical shaft at the Ironton mine near Bessemer, Michigan. The shaft is now down to ledge. The Ironton was opened up about 50 years ago.

The Al Johnson Construction Company has begun stripping at the Whiteside mine of the Snyder Mining Company at Buhl, Minnesota. The Whiteside is a former underground mine and was last operated about 35 years ago. Over 4,000,000 cubic yards of stripping will be removed from the mine and from the Kosmerl, which adjoins it on the south. R. M. Baker, superintendent of the Snyder Company's Virginia mine, will be in charge of operations at the Whiteside.

The Oliver Iron Mining Company is building a new washing plant to treat Hull-Rust lean ore. For some years

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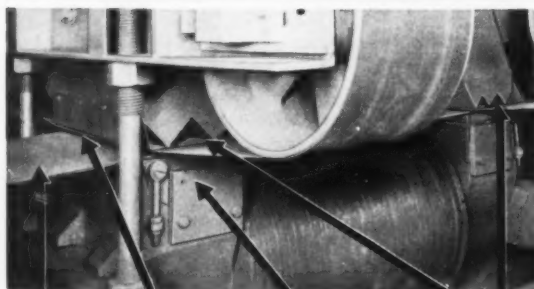


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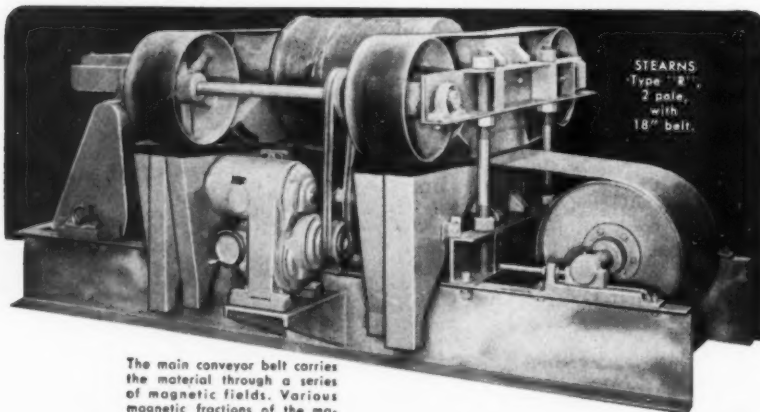
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past such ores have been shipped to the Trout Lake concentrator at Coleraine, Minnesota. The new plant will be located beside the present Hull-Rust crushing and screening plant, west of Hibbing, and the two plants will be inter-connected by belt conveyors. The new plant is expected to be completed by fall. The Oliver Company estimates that it will ship about 5,000,000 tons of wash ore concentrates from its Mesabi Range plants during the 1951 season.

The S. J. Groves & Sons Company has finished its stripping contract at Pickands Mather & Company's Mahanomen mine at Ironton on the Cuyuna Range, Minnesota.

Republic Steel Corporation expects to return its St. Paul and Stevenson mines to the shipping list this season. The Stevenson made its last shipment in 1948 and the St. Paul in 1949.

Itasca County, Minnesota, mine inspector, John A. Beecroft, in his report for 1950, lists 39 active and 26 idle mines in the county. A total of 3661 men was employed of whom only 195 worked underground. Underground ore shipped amounted to 434,407 tons out of a total for the year from Itasca County of 12,942,647 tons. The York mine at Nashwauk, opened in 1911 and operated by Coates & Tweed from 1917 to 1947, was taken over by the Pacific Isle Mining Company in 1948 and is still producing with over 3,000,000 tons to its credit. Mines that had a record of no lost-time accidents for the year were: the Arcurus at Marble, Oliver Iron Mining Company; the Buckeye, between Coleraine and Grand Rapids, M. A. Hanna Company; and the Bennett underground mine at Keewatin, Pickands Mather & Company.

Work is progressing steadily at Jones & Laughlin Ore Company's new Tracy mine at Negaunee, Michigan. The contractors, A. Lindberg & Sons, have moved more than 65,000 cubic yards of dirt in grading for the shaft and mine buildings and for the tunnel between shaft and dry and shaft and timber yard.

Officials of mining companies working in the Menominee, Gogebic and Marquette ranges of Michigan's upper peninsula recently appealed to the Chicago & North Western Railway System to move 8,000,000 tons of ore out of the port of Escanaba during the 1951 season. This amount is nearly two million tons more than was shipped from the railroad's Escanaba docks in 1943, the heaviest season on record. Limited factors on the shipment of this quantity of ore, as stated by officials of the C&NW railroad, will be the limited dock space at Escanaba, the number of available ore cars, motive power to move the ore from mines to the docks and man power to handle it. Escanaba is the first iron ore shipping port to open in the spring and the last to close in the winter due to its location at the northern end of Lake Michigan. The harbor was officially opened March 20 by two ice breakers, the Coast Guard cutters Mackinaw and Woodbine, which cleared a lane up to the ore docks. In contrast to last year's late start of the shipping season, this is the earliest opening in several years. The first trainload of ore arrived at Escanaba on March 21 from the Sherwood mine of the Inland Steel Company on the Menominee range, approximately 100 miles distant.

MINING WORLD

precipitates—ROCKY MOUNTAIN

Climax Molybdenum Is Increasing Operations

The Climax Molybdenum Company has a major expansion program under consideration at its Climax, Lake County, Colorado, mine and mill. The program would increase primary mill capacity from 15,000 to 20,000 tons per day and would increase by-product plant capacity by 250 percent. In the mine five new blocks are to be caved between the Phillipson and White levels and development of the Storke level, 300 feet below the Phillipson, is to be speeded up. Other improvements and additions will include new housing, more water lines and further camp facilities.

During 1950 the company recovered approximately 162,000 pounds of tungsten in tungsten concentrates and undertook a research program to develop methods to increase tungsten recovery. The by-product plant also recovered pyrite, tin concentrate, monazite and topaz from the molybdenite tailing. In the plant the tailing from molybdenite flotation is pumped into Akins classifiers with Hydroseal pumps. The classifier sand contains the by-product minerals and is pumped to 128 Humphreys spiral concentrators which make a low grade concentrate and a tailing. Classifier overflow and spiral tailing is discarded. Pyrite is floated from spiral concentrates and pumped to a stockpile. Pyrite flotation tailing is treated by Wilfley tables and the table concentrate goes to wet magnetic separators where an iron concentrate (ball metal) is removed. High powered magnetic separators remove tungsten and discharge it to small hoppers for sacking. Tungsten tailing is returned to flotation machines and the flotation concentrate is next treated by Wilfley tables to recover tin.

Climax is employing 455 men in the mine, 150 on surface and 152 in the mill

and treating 15,000 tons of ore per day, the maximum capacity of the mill on an efficient recovery basis. W. J. Coulter is vice president and C. J. Abrams is general superintendent of operations.

Leadville Tunnel Driven Beyond 8,500 Foot Point

Crews of the Utah Construction Company, which is driving the Leadville Drainage Tunnel under contract from the U. S. Bureau of Mines, established a weekly footage record of 174 feet of tunnel advance between March 12th and 17th. Total March advance was 567 feet, which lengthened the tunnel to 8,500 feet. The first objective, the Robert Emmett shaft, is 1,600 feet ahead of the breast. Crews under the direction of Harry Greshuk, Utah Construction's project manager, and Edward Matsen, Bureau resident engineer, hope to reach the shaft by June 30th, if unexpected bad ground or too much water is not found.

Mineralization in the Cambrian quartzite has been found at several places within the last 1,000 feet of tunnel. Best values have been found in the Little Chief, Dives and Dolphin claims. The grade and continuity of mineralization have not been ore grade but indicate the desirability of prospecting the overlying Peerless shale and White and Blue limestones. John H. East, Jr., the Bureau's first director of Region IV, is in charge of the tunnel.

Crescent Fissure Area to Be Crosscut on the 2100

The joint Park Utah Consolidated Mines Company and Silver King Coalition Mines Company development of the Crescent fissure area from the Park Utah mine has resulted in the discovery of two small silver-lead-zinc-bearing fis-

tures in the Weber quartzite on the 1900 level, according to Paul H. Hunt, vice president and general manager of Park Utah.

These fissures, the 1700 and 1906, are being developed. A raise is being driven on the 1700 fissure from the 1900 level and a stope is being mined from the Weber quartzite in the 1906 fissure above the 1900 level. The contact between the Weber quartzite and the Park City limestone probably will be found at about the 1850-foot point in the 1906 fissure area.

Two crosscuts are being driven on the 1700 level. The first is being driven to cut the 1906 fissure and to search for replacement orebodies in the limestone. Some mineralization has been cut in this crosscut. The second crosscut, east of the first, is being driven to seek the 1909 fissure in the limestone.

In view of the exploration results on the 1700 and 1900 levels, officials believe that the Crescent fissure may be found farther to the west in the joint-agreement area. An existing crosscut on the 2100 level about 2,000 feet west of the upper crosscuts will now be extended into the Crescent area.

COLORADO

Uranium-vanadium operations in the southwestern part of Colorado are expected to expand because of the higher prices and the new uranium bonus which the U. S. Atomic Energy Commission made effective on March 2, 1951. The following reports have been received on some of the uranium producers who are active in the area: In San Miguel County, the Ortmayer Mining Company is contracting mining operations for the

CALLAHAN ZINC-LEAD TO EXPLORE MINE ADJOINING AKRON UNIT

The Akron Unit of the Callahan Zinc-Lead Company at Whitepine, Gunnison County, Colorado, is pictured here. The company plans a development program in ground held by the company and in adjacent properties owned by others. Under the terms of an agreement recently made, the company holds a lease and option on large adjoining areas. A program has been laid out to extend present workings about 2,000 feet to a point underneath old workings on the adjacent property which had a favorable production record from higher levels. In reaching its objectives, the work will explore a favorable structure for about 1,500 feet within the company's property. Application has been made for government aid under the DPA of 1950 to the Defense Minerals Administration to finance this program, estimated to cost about \$200,000. A total of 12,331 tons of ore was mined at the Akron in 1950 under the supervision of James E. Dunn, superintendent.



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Minerals Engineering Company on the Legin group of claims in the Slickrock district (Ortmayer is the owner of the Empire group of claims in the McIntyre district). J. B. Crowley is operating the Charles T. group of claims under lease from the AEC in the Slickrock district. Nielson and Larson are leasing the Goldenrod group of claims in the same district from the AEC. The Ward Mining Company, which owns the Uintah group of claims in the Slickrock district and the Charles A group in the McIntyre Canyon district, is leasing the Uintah group to the Fletcher-Wolf Mining Company, now operating. The Kentucky-Utah Mining Company is developing a group of claims in Gypsum Valley. In Montezuma County, the Four Corners Uranium Company is operating claims in the McElmo district. In Montrose County, in the Bull Canyon district, L. B. Wright is producing ore from a group of leased claims. J. W. Gramlich is operating several properties on Lion Creek. And in Mesa County, the Gateway Mining & Development Company is active in the John Brown and Lumsden districts.

The Shenandoah-Dives Mining Company is mining and milling 600 tons of ore per day from its own mines and the leased Silver Lake unit of AS&R. The company is the largest operator in San Juan County, Colorado, and employs 100 men in the mine, 36 on the surface, including the tram crew, and 27 in the mill. Charles A. Chase of Silverton is executive vice president.

The U. S. Atomic Energy Commission has requested that Public Land Orders No. 459 and 494 be modified so as to re-

store approximately 42 square miles of land in Colorado to the public domain. These lands are in T. 50 N., R. 17 W.; T. 49 N., R. 18 W.; T. 50 N., R. 18 W.; and T. 51 N., R. 18 W., Mesa County. In T. 43 N., R. 19 W.; T. 44 N., R. 19 W.; and T. 44 N., R. 20 W., San Miguel County. At the same time, under Public Land Order 698, approximately 86 square miles of land has been withdrawn from mineral entry. This land is in T. 49 N., R. 17 W. and T. 50 N., R. 17 W., in Mesa County, and T. 46 N., R. 17 W.; T. 47 N., R. 17 W.; T. 48 N., R. 17 W.; T. 49 N., R. 17 W.; and T. 48 N., R. 18 W., Montrose County, and will be studied and tested by diamond drilling for uranium orebodies.

James N. Pastore is trenching and cleaning overburden in the search for a gold-bearing vein at the Maximillian mine in the Gold Hill mining district, Boulder County, Colorado.

The Golden Cycle Corporation was host to a large group of Denver members of the Bond Club at its Cripple Creek district gold mines and the new Carlton Mill on March 23rd. The new mill is gradually being brought up to capacity, 1,000 tons per day. Max W. Bowen is vice president and general manager of Golden Cycle, and Harold Worcester is assistant general manager.

The Consolidated Caribou Silver Mines, Inc., has filed an application for a \$300,000 loan from the Reconstruction Finance Corporation. The firm has been mining silver-lead ore at its Caribou mine in Boulder County, Colorado, while prospecting for uranium ore in the mine. Ore is treated in the company's mill at Lake-wood, Boulder County. Donald M. Nel-

son is president, treasurer and director of the company, which has its head office at 328 South Beverly Drive, Beverly Hills, California.

The U. S. Atomic Energy Commission has made plans and recommendations for roads in the southwestern part of Colorado, according to Frank H. MacPherson, manager, Colorado Raw Materials Operations, Grand Junction. In Mesa County, recommended road improvements include the John Brown Canyon road west of Gateway, the Monogram, Calamity and Outlaw mesa districts, and improvement of Colorado Highway No. 141 from Gateway south to the Montrose County line. In Montrose County, Highway 141 from the Mesa County line south to Naturita and the Club Mesa road, and in Montrose, San Miguel and Dolores Counties State Highways 80 and 90 would be improved.



The Feldspar Producers Association, Custer, South Dakota, plans to act as a tantalite-columbite purchasing agent for the Chem-Metals Company, of Salt Lake City. H. R. McLaughlin, association president; B. A. Gira, secretary, and Robert Deming of Chem-Metals recently concluded an inspection tour of the feldspar and mica mines of the Black Hills to

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check on stocks of tantalite and to inform producers of the new market for tantalite-columbite.

The Homestake Mining Company was again the largest gold producer in the United States in 1950. The company's mine at Lead, Lawrence County, South Dakota, produced 1,265,118 tons of ore from which gold and silver valued at \$15.23 per ton was recovered. Mill recovery was 97.03 percent, an increase from 1949's recovery of 96.98 percent. Shrinkage and square-set stoping are used in mining the ore. These methods permitted the mining of higher-than-average-grade ore during 1950. Ore reserves at the end of 1950, including 430,000 tons of broker ore in shrinkage stopes, were

20,804,000 tons. Guy N. Bjorge is general manager and H. A. Walker is assistant general manager.



James Ivers, vice president and general manager of the Silver King Coalition Mines Company, Park City, Utah, has reported that a new lead-zinc-silver ore-body has been found on the 400-foot level of the mine's Silver Hill section.

The J. R. Simplot Company is acquiring

a large group of uranium-vanadium claims in southern Utah. Simplot is vice president of the Vitro Chemical Company, which is converting the Kalunite plant at Salt Lake City for the processing of uranium-vanadium ores. O. E. Bothier, engineer, and Chester A. Wright, field superintendent, for Simplot are in charge of Simplot's uranium and vanadium development and mining operations.

Arthur L. Montgomery of Marysville, Utah, has reported that autunite mineralization has been found in a 130-foot-long tunnel in the Dark Horse No. 1 claim two miles north of Marysville.

W. C. Keeley, president, Vanadium Corporation of America, has reported that the corporation's "mining operations at Marysville have been enlarged . . . and substantial uranium reserve values have been proved." The corporation continued development and experimental work at its White Canyon operation in Grand County, Utah, he added, and has let a contract to I. Sander & Co. of Salt Lake City for trucking supplies to the White Canyon mill. Sander & Co. has completed installation of large fuel-oil and acid-storage tanks at Elgin, Utah. From Elgin small tank trucks are used on the White Canyon haul.

The Murray Refractories Company has announced a \$170,000 expansion program at its Salt Lake City brick plant. The company has requested a five-year amortization schedule from the Defense Minerals Administration for a new fire-clay grinding unit estimated to cost \$86,000. The plant is managed by J. E. Stevens.

The U. S. Atomic Energy Commission is now purchasing under contractual arrangements with ore producers, copper-bearing uranium ores at its Marysville, Piute County and Monticello, San Juan County ore purchase depots. Ores meeting the specifications of Domestic Uranium Program Circular No. 5, Revised, with respect to U_2O_5 content, lime content, physical characteristics and impurities will be purchased. No payment will be made for vanadium but the contracts may provide for payment for some of the copper.

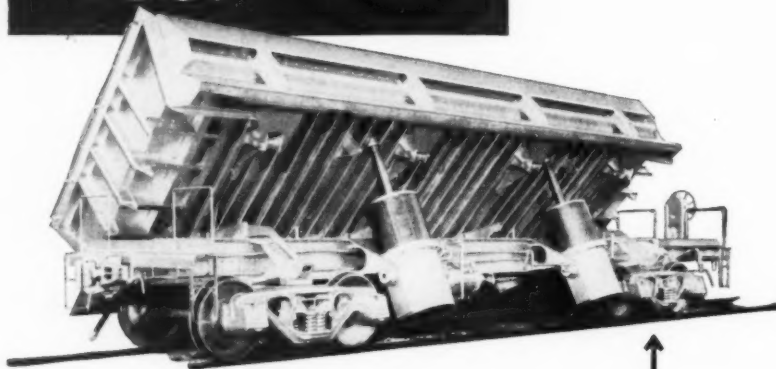
Development work at the Happy Jack mine in the White Canyon district San Juan County, Utah, is disclosing additional tonnages of copper-uranium ore, according to reports. The mine has been worked for the last two years by Fletcher and Grant Bronson and Joe Cooper of Monticello. The ore has been treated in the White Canyon mill of the Vanadium Corporation of America.

J. W. Petersen of Boise, Idaho, has announced plans for construction of a \$500,000 gypsum-product plant at Green River, Emery County, Utah. High grade gypsum will be mined at a point 10 miles west of Green River and trucked to the proposed mill site for the manufacture of gypsum board and other products.

Filtrol Corporation has started test production at its new \$3,500,000 Salt Lake City plant, according to Arthur D. Yates, general manager. The plant will process halloysite and bentonite clay, from the Dragon Consolidated Mining Company's mine in the Tintic district, and from other Filtrol mines into oil refinery catalysts.

The Barite Corporation, a Nevada firm, has secured a lease from the confederate tribes of the Goshute Indian Reservation, Juab County, Utah, for mining of quartz crystals and other minerals.

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AS&R Options Control Of Silver Buckle

An agreement has been concluded between American Smelting and Refining Company and Silver Buckle Mining Company giving AS&R an option on about two-thirds of Silver Buckle's 10,000,000 capital shares. AS&R will pay for the interest by doing \$1,392,000 worth of development work over the next six years. The agreement may be terminated any time on or after December 31, 1952, and if it is, AS&R will acquire in payment for development to date surface rights to about 155 acres of Silver Buckle land in Lake Gulch and an easement for a shaft and underground workings there.

AS&R will start detailed geological study of Silver Buckle's 2,500 acres of claims very shortly and will then release the operating plan. Probably diamond drilling and exploratory crosscutting and drifting from the bottom of the 3,000-foot Vulcan shaft will be done. A new deep-level shaft may result from exploration.

J. E. Berg, manager of American Smelting's Northwest Mining Department, and F. E. Scott, president of Silver Buckle, released the news of the negotiations.

Montana Rainbow Closing; Equipment for Sale

Montana Rainbow Mining Company, Marysville, Montana, operator of the famous Drumlunnon gold mine, is closing because of high cost of operation.

The company is offering a large amount of recently overhauled equipment for sale including two hoists (one double-drum 100 hp. and one single-drum 75 hp.); six electrically driven centrifugal mine pumps (three with 75 hp., two 50 hp., and one 15 hp.); a 2½-ton, storage-battery locomotive (18-inch track gauge); two double-drum scraper hoists (one 15 to 25 hp., the other 7½ hp.) with slusher buckets; three compressors (one a 175 hp. Ingersoll-Rand X.R.E. 1050 cu.

ft., the second a 100 hp. Gardner-Denver 380 cu.ft., and the third a 50 hp. Worthington 285 cu.ft.); and, in addition, auxiliary equipment and mine tools. See the advertisement in this issue for further details.

Simplot Opening Custer County Fluorspar Mine

The Fluorspar mine at Myers Cover, Custer County, Idaho, will be opened by the J. R. Simplot Company. The company plans to improve the access road, is doing development work, and is rehabilitating the mill as well as expanding its capacity. The first shipments of concentrates may be sent by mid-summer. The company has let contracts for three year's production and for further development.

Keith Madill is manager of the mine and Frank Hancock is superintendent.



Day Mines, Inc., has bought the Alma group of 10 patented claims, bringing to four the number of properties the company has acquired in the past couple of months. The Alma group is east of the Gold Hunter property, Day's most recent purchase, and is partially separated from it by the Hunter silver-lead mine. All of these mines are in the Mullan, Idaho, area.

The Federal Mining and Smelting Company, operating the Page mine near Kellogg, Idaho, is carrying on engineering studies to locate and to design a new working shaft, which, if approved, would cost \$1,000,000 to sink and equip.

The Triumph Mining Company has started operating its new 200-ton flotation plant in the Warm Springs district of

Blaine County, Idaho, four years after the loss of the old plant by fire. M. A. Jorgensen, former superintendent for ASARCO in Newfoundland, is mill superintendent. A. H. Shoemaker is general manager. The Triumph is owned by the Ivanhoe Mining Company, Federal Mining and Smelting Company and Snyder Mining Company. Exploration is continuing and enough ore is said to be blocked out to pay for the mill. About 140 men are employed.

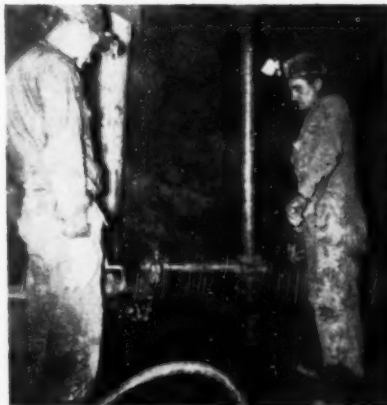
The present activities of Sidney Mining Company at Kellogg, Idaho, were outlined recently by Malcolm C. Brown, superintendent. The company has sunk the three-compartment shaft 500 feet below the 900 level and is opening two new levels. Crosscutting on the 1100 is beginning. Two new stopes have been started on the 900 level, one on an oreshoot about 150 feet long and the second one on a footwall branch of the vein in the east oreshoot. Current mill throughput is 265 tons per day, or capacity.

On the 2800 level crosscut Coeur d'Alene Mines Corporation of Wallace, Idaho, has cut an orebody about two and a half feet wide containing copper-silver values. Copper has been found in the property before but is still considered unusual. Previous diamond drilling in the area had given no indication of copper, which is not as high grade as some in the past but is of possible economic importance.

Clayton Silver Mines Company completed most of the necessary development work on the new 400 level during 1950 and advised that the north oreshoot on this level is the best feature encountered in the mine to date. The orebody, still being developed, is about 280 feet long and 40 feet wide with a reported better-than-average grade of lead ore. The company is now planning to increase power output, necessary for any large development work which may be done. Ore reserves are sufficient for six more

CROSSCUT-ADIT AT TWIN PEAKS MINE NEARS 1,100-FOOT POINT

Working through the winter months at the Twin Peaks mine 17 miles south of Salmon, Idaho, and 1½ miles west of the Salmon river, Idaho Consolidated Mines, Inc.'s drifting crews have driven the 5 by 7 foot exploration-development adit to a point 1075 feet from the portal. At left, Dewey Bilbrey watches as his partner, Raymond Blood, tightens the crossbar on a screw-type column to drill lifter holes with a Gardner-Denver CF-79 drifter. At right, Edmund G. Wilson, president of Idaho Consolidated, and his daughter, Carrie Belle, walk down the straight, timbered, cribbed adit.



years at present milling rate. During the last year Clayton produced 31.8 ounces of gold, 114,044 ounces of silver, 2,391,666 pounds of lead, 830,859 pounds of zinc and 18,475 pounds of copper. Net profit was \$91,941.

The Emperor-Duchess Mines Company, Inc., of Fairfield, Camas County, Idaho, recently filed articles of incorporation in Idaho. The company is capitalized for \$100,000 and owns claims in the Papago Indian Reservation of Arizona. Incorporators were Don Bauscher, Ben Lasswell and S. P. Ramey, all of Fairfield.

Among mining companies in the Murray, Idaho, district awaiting good weather to resume operations are the Trail Creek Gold Mining Company, and the Dream Gulch Gold Company. Trail Creek operated its dragline last season above Delta

and will continue in that area. The company's claims include the Pilot mine, the Gold Coin group, the Crown Point and the Flagstaff groups. Dream Gulch did exploratory work last year and will do development on ground west of Murray this year.

Hypothek Mining and Milling Company is about to begin unwatering and examining of the King of Pine Creek mine, acquired last year. A pump is being moved from Hypothek ground to the King for the job. Hypothek also reports that a lease has been obtained from the State of Idaho on Section 14 where the westerly extension of the Hypothek zinc vein lies.


Lookout Mountain Mining and Milling Company began diamond drilling in

March at its Pine Creek, Idaho, properties. The area below the bottom of a 225-foot winze off a drift is being explored. At 250 feet below the drift floor the Lookout vein and the large pre-mineral overthrust fault are thought to intersect in a brecciated zone up to 70 feet in width. When drilling confirms this formation, the winze will be dewatered and sunk into what is anticipated to be a workable orebody.

Further development work under the supervision of Polaris Mining Company in Silver Summit Mining Company's property will include a ventilation cross-cut on the 3,000 level and replacement of three small surface compressors by one large new one underground. Of \$1,100,000 owed to Polaris, Silver Summit has repaid \$500,000 in less than a year.

In Coeur d'Alene Mines Corporation's annual report are the suggestions of John B. Platts, consulting engineer and geologist, that the company explore Rainbow Mining & Milling Company ground from the deep workings of the Coeur d'Alene mine and that further exploration be done in the southwestern section of the latter. Platts also said that before the company sinks a proposed offset shaft 600 feet below the 2,800 level, further diamond drilling should be done.

At Kellogg, Idaho, the Sunshine Mining Company plans further deep development and will sink the No. 5 winze below the 3,700 level to open up a 3,850 and a 4,000 level and explore the eastern section of the mine. The company advises that conversion of the No. 4 winze from a service winze and ore transfer to a hoisting shaft between the 3,100 and 3,700 levels is coming along well. In the annual report, R. M. Hardy, president, gave the following production and recovery figures: 251,877 tons of ore yielded 10,586,439 pounds of lead, 2,239,627 pounds of copper and 8,291,948 ounces of silver. Reserves are estimated at 902,000 tons. Net income for 1950 was \$1,660,871.



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Alps Mining and Milling Company has obtained the Argo tungsten mine from the James F. McCarthy estate, according to James P. Smith of Missoula, president of Alps. The Argo is four and a half miles from the Alps gold mine and mill, not far from Clinton, Missoula County, Montana. The Argo comprises 14 patented claims, was originally developed for gold, but has an orebody of ferberite blocked out, and will be mined at a rate of 100 tons daily. The company is adding a tungsten circuit to its gold flotation mill.

James Charlton, Melvin Fabert and Merrill Christman, mine operators of Missoula, Montana, are opening the Amador mine in the Cedar Creek area near Superior, Montana. The mine had been idle since 1920. A crew of five men is unwatering the old workings, which include a 700-foot shaft, retimbering, and will replace the old mill. Cost of rehabilitation is expected to be about \$85,000. Several shipments of ore have been sent to the Anaconda smelter. The main mineral is copper with some gold and silver values.

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A special bill has been introduced in the Canadian legislature to allow the export of 40,000,000 cubic feet of natural gas daily from Alberta to the Anaconda Copper Mining Company's Great Falls and Anaconda, Montana, smelters. Charles E. Wilson, mobilization chief of the U. S., requested the gas.

A vein of silver-lead-copper-gold was opened in Nancy Lee Mines, Inc.'s lower tunnel in its mine near Superior, Montana, according to C. R. Ranney, engineer in charge. The strike was made after Nancy Lee had extended the old 1,820-foot tunnel an additional 700 feet. Over 100 tons of development ore are stock-piled, and the 125-ton mill will begin operation as soon as 600 tons are stock-piled.

The North Butte Mining Company has crews at work at its Granite Mountain mine near Butte, Montana, repairing timbers and machinery and installing equipment for the company's big copper leaching and precipitating project. The company has several dumps aggregating over 1,000,000 tons of low grade copper ores suitable for leaching, and has about 3,000,000 tons of low-grade ore left in stopes when richer ores were extracted. A loan from the Reconstruction Finance Corporation totaling \$425,000 was obtained to pay the cost of leaching plant

installations, Joseph E. Parker, president announced.

The Sunlight Mining Company has applied to the government for a lease on 600 acres of phosphate-bearing property on Princeton Creek, east of Maxville, Granite County, Montana. The company already has 49 claims adjoining the land requested. Fred G. Fulton of Spokane and president of Sunlight made the announcement.

Recently incorporated in Montana were the following companies: L. M. S. Placer Mining Company of Butte, with capital stock of \$50,000, and headed by Frank Lamb, Montie Murphy and John C. Seamon of Butte; Howe Mining Company of Billings, with capital of \$50,000, and headed by W. E. and Iva Clark, of Belfry and R. N. Howton of Florence; and Triangle Gypsum Corporation, with capital of \$250,000, and headed by John A. and Marvel May Chambers and William G. Baucus of Great Falls. They will mine gypsum in Judith Basin and Cascade counties.

WASHINGTON

Ore shipments are to be started immediately by the Columbia Lead and Zinc Mining Company from its Metaline, Washington, mine where 1,400 feet of longhole drilling recently was completed. The ore will be sent to a custom mill. Raymen Paulsen of Plaza is president of the company; he recently succeeded Harry Homad who switched jobs with Paulsen and is now vice president.

According to reports the Aluminum Company of America is considering Wenatchee, Washington, as the site for a new aluminum plant in the northwest. The company is prepared to build a plant capable of turning out 170,000,000 pounds of aluminum per year if power is made available. Construction could be completed in about two years. Recent reports of filings on bauxite claims in Oregon near Grants Pass may have been stimulated by both Aluminum Company's proposed plans and those of the Harvey Machine Company to build an aluminum plant in the northwest.

Through proceeds from a stock offering now being made, the Talisman Mining and Milling Company of Spokane is planning to rehabilitate and develop the Laurier lead-zinc mine in Ferry County, Washington, 30 miles west of Trail, B.C. The mill on the property, under lease until July to Silver Trail Leasing Company, will be repossessed. Henry T. Born of Hayden Lake is president of Talisman.

Exploration by the American Zinc, Lead & Smelting Company in the Slate Creek area of Metaline, Washington, revealed important orebodies during 1950, according to Howard I. Young, president. The Lead Hill mine was the scene of the strikes. Last year several thousand feet of bulldozing and several hundred feet of underground tunneling and diamond drilling were done in this mine. American Zinc also operates the Grandview mine at Metaline Falls and properties in several other states and British Columbia. The only other important ore discoveries the company made during last year were in Tennessee.



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CARBONATE

Continued from Page 19

was ordered and a store and about 20 cabins were constructed. While the boom lasted it was announced that "Denver parties are arranging to open a reliable banking establishment; a sawmill is being set up. A contract has been let for a commodious hotel. The day is not far distant when the railroads will center here."

There were two routes to the camp, by way of Red Cliff or by Aspen. Everyone was warned not to try to reach the diggings before the first of June and even then snow often delayed the last 12 miles of the trip. To facilitate transportation, a bridge was built across the Colorado River at Dotsero and a toll road was built from it to Carbonate, a distance of 17 miles.

Lured by the promise of rich strikes, hundreds of miners rushed to the new bonanza. On May 5, 1883, a *Denver News* reporter visited the camp and described the hardships encountered in packing in. He wrote:

"We arrived in Carbonate City yesterday having with four others hauled 600 pounds of supplies on a sled a distance of 12 miles over snow ranging from four to 10 feet deep. The road can be made good after the snow melts; at present it is only a footpath.

"The townsite is in a level park surrounded by low hills and buttes and covered with heavy forests and tall straight spruce trees. There are 42 men in camp preparing for the summer campaign. Hundreds are en route and are camped on the ground at the mouth of the Eagle river. Those who wait a month will save themselves expense . . . It takes nerve, muscle and money to get here. It has cost us \$200 to get into the camp. We paid five cents a pound from Red Cliff to Dotsero and from there to snowline six cents or seven cents a pound. From Coffee Pot Springs in, via hand sled and man power, the rate has been 10 to 15 cents a pound."

All summer the miners dug frantically trying to uncover rich ore which would justify the reports circulated about the camp, but it was soon apparent that this was no second Leadville. Low grade ores and the difficulties of transportation to and from the valley doomed further development and late in August 1883, the decline of mining activities

led to almost complete abandonment of the site. The county-seat was moved to Glenwood Springs and only a few prospectors stayed on in their high, wind-swept cabins.

During 1884, E. E. Winslow ran a stage line between Aspen and Glenwood Springs. He also held a government contract to furnish daily mail service to Carbonate. This meant a 40-mile round trip over bad roads to a ghost town, for by then Carbonate had but one inhabitant, an old miner whose faith in the camp was still strong. Winslow tired of making the routine trip up the Flat Tops for one person who seldom got mail, so he asked the man how much he'd take to agree to leave the camp. The old prospector chewed his tobacco awhile and then said: "A hundred dollars." Winslow paid the money on the spot, waited for the old fellow to throw his few

possessions together, and then drove back to Glenwood with Carbonate's last resident on the seat beside him.

Today Carbonate City is almost gone. A few weathered, roofless log cabin-frames dot the rocky flats where the town once stood or are hidden by trees which are pressing around them. One large cabin encloses an open shaft with part of a ladder leading into the black hole. Elk hunters camp near the site each fall and fishermen pass within a quarter-mile of it on the way to Deep Lake, but it is almost invisible from the trail. According to one old-timer, it had a population of about 3,000 when it was booming and lots of cabins, "but the biggest part was all tore down." The road in, even today, is steep and from Broken Rib creek only wagon ruts mark the rolling grass-covered meadows to Garfield's first county-seat.

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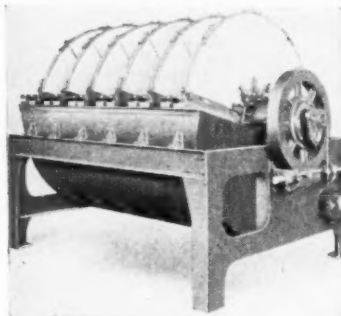
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- 1-Sullivan, Model B-211, 2 drum, electric tugger
- 1-Ingersoll-Rand new size 20-MNM-2D, 3 drum, electric slusher hoist
- 3-7½ HP Sullivan electric tuggers
- 9-7½ HP Sullivan double drum electric tuggers

FILTERS

- 1-4" 1-disc Oliver United continuous filter
- 2-6" 2-disc American continuous filter
- 1-4"x6" Morse Bros. continuous drum filter
- 2-8"x12" Einco continuous drum filter



- 1-36" Merrill triangular leaf filter press
- 1-12 Sweetland 36 leaf filter press

FLOTATION MACHINES

- 1-Morse new "Jetair" hydra cell
- 2-2 cell Denver Equip. #21 flotation machines
- 1-3 cell Denver Equip. #21 flotation machine
- 2-6 cell Denver Equip. #21 flotation machines
- 1-8 cell Denver Equip. #21 flotation machine

SAND PUMP

- 1-1" Willley Sand Pump
- 5-2" Willley Sand Pumps
- 1-2" Denver vertical Sand Pump
- 2-2½" Telluride Sand Pumps
- 1-2½" Traylor Sand Pump
- 1-3" Allen-Sherman-Hoff rubber lined "Hydro-seal"
- 1-3" Telluride Sand Pump

- 1-4" Denver Vertical Sand Pump
- 1-4" Allen-Sherman-Hoff "Hydro-seal"
- 2-6" Willley Sand Pumps

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- 1-30"x24" new Morse batch mill
- 4-3"x2" Marcy ball mills
- 1-4"x4" Standard ball mill
- 1-5"x4" Colorado Iron Works ball mill
- 2-6"x36" Hardinge conical ball mills
- 2-8"x22" Hardinge conical pebble mills
- 1-64½ Marcy ball mill
- 1-38" Dewco tube mill

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- 3-4½" x 3½" Gardner Denver
- 1-4" x 4" Chicago Pneumatic
- 1-6" x 8" Goulds
- 1-4" & 4" x 2½" Ingersoll Rand
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- 1-7½" x 4" Colorado Iron Works
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- 6-23 cu. ft. rocker dump, 18" ga.
- 1-27 cu. ft. rocker dump, 30" ga.
- 3-27 cu. ft. Koppel rocker dump, 24" ga.
- 3-34 cu. ft. Hendy rocker dump, 18" ga.
- 3-55 cu. ft. Insley rocker dump, 30" ga.
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- 6-2 cu. yd. Koppel rocker dump, 36" ga.
- 1-18 cu. ft. side dump, 24" ga.
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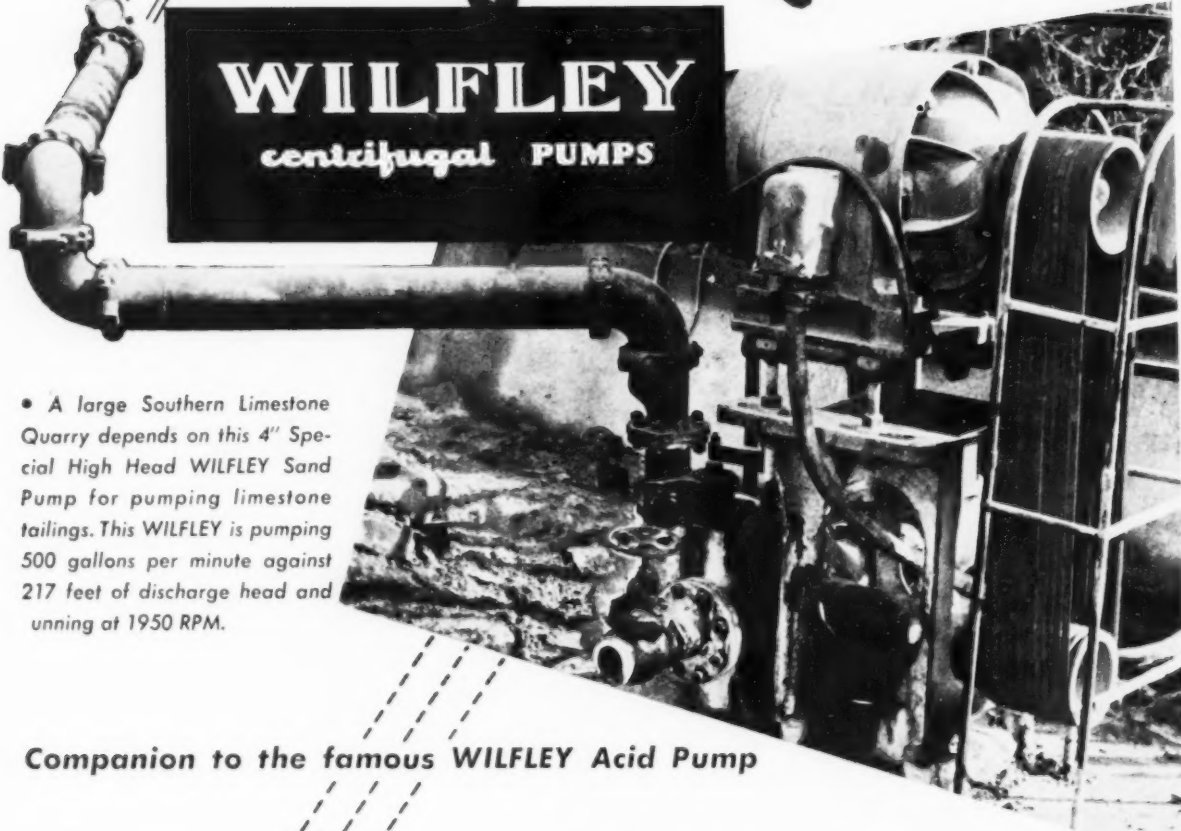
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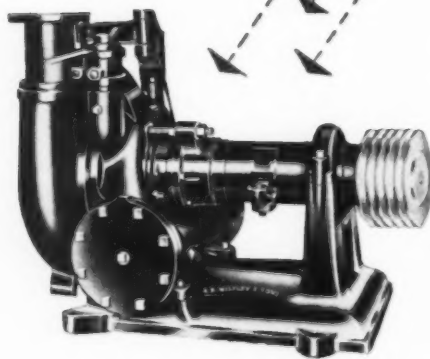
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